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Driving Agricultural Transformation with the Power of Information and Communication Technology:

The Performance of Nigeria's Growth Enhancement Support Scheme

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ABBREVIATIONS AND ACRONYMS

ATA	Agricultural Transformation Agenda
ATT	Average Treatment effect on the Treated
CBN	Central Bank of Nigeria
FCT	Federal Capital Territory
FMARD	Federal Ministry of Agriculture and Rural Development
GESS	Growth Enhancement Support Scheme
HLS	Helpline staff
ICT	Information and communication technology
IFDC	International Fertilizer Development Center
LGA	Local Government Area
RC	Redemption Centre
SCM	Supply Chain Manager

ABSTRACT

Nigeria liberalized input distribution and established the Growth Enhancement Support Scheme (GESS) in 2011 to deliver subsidized inputs to farmers as part of its Agricultural Transformation Agenda (ATA). Despite the relevance of the GESS as a subsidy delivery mechanism, its achievements during the first year of implementation (2012) were below expectations. In 2015, as the first phase of the GESS is ending, has there been any significant improvement in its implementation? What improvements have occurred in redemption and participation rates? Even though the GESS is known to be making contributions in terms of ensuring direct access by farmers to subsidized inputs, the main determinants of farmers' participation remain unknown. This study seeks to (i) examine the application of ICT innovations in the implementation of the GESS; (ii) assess its implementation performance from inception to date; and (iii) determine the factors influencing farmers' participation in the scheme. The study is timely and has significant policy relevance judging by the desire of the government of Nigeria to understand the performance of the GESS in view of the enormous financial and material resources that have been committed to the scheme since its inception in 2012. An evaluation of the performance of the GESS will provide the government with feedback required for making adjustments in input subsidy spending, especially in the face of the recently declining oil revenues. It becomes imperative to have evidence to inform policy decisions regarding possible adjustments as the scheme passes over the first phase.

The process of targeting farmers to benefit from the input subsidy program under the GESS started with the registration of 3.9 million farmers in 2012. The number increased to 9.5 million in 2013 and 10.5 million in 2014. The number of farmers targeted for the subsidy benefit also continued to increase from 1.1 million in 2012 to 7.2 million in 2013 to 8.3 million in 2014. Under the scheme, the quantity of fertilizer distributed to farmers increased from 120,900 metric tonnes in 2012 to 466,600 metric tonnes in 2013, rising phenomenally to 748,800 metric tonnes in 2014. On fertilizer subsidy alone, the amount spent by the federal government rose from 6.65 billion naira in 2012 to 22.92 billion naira in 2013 to 41.19 billion naira in 2014. This implies that the total public spending on fertilizer subsidy (by federal and state governments) over the period increased from 13.30 billion naira in 2012 to 45.84 billion naira in 2013 to 82.38 billion naira in 2014. The number of farmers that benefited from the subsidy increased from 729,000 in 2012 to 4.12 million in 2013 and 7.22 million in 2014. The study concludes that the implementation of the GESS is on a path of continuous improvement; and that the policy and strategic reforms in input subsidy delivery have yielded many of the desired results.

Keywords: input subsidy, Growth Enhancement Support Scheme, electronic-wallet, performance evaluation, small-scale farmers, Nigeria

I. INTRODUCTION

Information and communication technology has galvanized the world into a global village. The potential of mobile technology to provide farmers with the services and information they need to improve their productivity, gain access to input, output, and financial markets is being enthusiastically demonstrated in Asia (Abraham 2007; Gandhi et al. 2009; Labonne and Chase 2009; de Silva and Ratnadiwakara 2008) and Africa (Aker 2008, 2010, 2011; Furuholt and Matotay 2011). Policy makers, entrepreneurs, and development partners are also showing interest in taking steps to make mobile services more popular and more accessible to farming communities so that farmers are equipped with the tools they need to commercialize their production activities and reap the desired returns to improve their standards of living.

In Nigeria, both the public and private sectors are placing increasing emphasis on service delivery through mobile phones and other ICT means in many sectors of the economy, including education, health, banking, commerce, and agriculture. The use of mobile phones in agriculture to deliver services to small-scale farmers is a major component of the Agricultural Transformation Agenda (ATA), which was designed by the federal government in 2011. Although the use of ICT in agriculture pre-dates the ATA, the introduction of mobile phones to deliver services directly to small-scale farmers is a key initiative under the ATA. The mobile phone initiative (electronic wallet) stands out in terms of its policy linkages, geographical spread (national coverage), and other networking opportunities it can create for farmers to play an active part in various agricultural commodity value chains. The policy linkages it offers, in particular, raise a fundamental question as to what its contribution has been in terms of driving a policy along a successful path when similar policy reforms in the past have often failed. The input subsidy policy in the country is a case in point here. Since the 1970s, various subsidies have been applied. The rates of subsidy have varied over the years in response to various challenges the policy had encountered. However, at no time has there been comparable success to that achieved under the Growth Enhancement Support Scheme (GESS), which is a flagship program of the ATA.

The GESS has brought a degree of sanity to agricultural input markets; reducing corruption and ensuring that subsidized inputs are delivered directly to the intended beneficiaries. Since 2012, the GESS has made significant strides. However, some teething problems are far from being fully eliminated. In spite of its relevance, in its launch year in 2012 the GESS did not meet expectations. A recent assessment shows that an average turnout rate of 32 percent and a redemption rate of 67 percent of farmers were recorded. Redemption implies that 67 percent of farmers who turned out at a redemption center were able to successfully obtain subsidized fertilizers using the e-wallet system. A breakdown of the turnout rate across the geo-political zones shows below-average performance in most zones. With the exception of the Northwest where the rate is above national average (50 percent); the rate is very low in other zones, ranging from 21 percent in the Northeast, to 18 percent in the North-Central, 6 percent in the South-South, and only 3 percent in both Southeast and Southwest. According to Adesina (2013), the low turnout rate reflects the current low adoption of fertilizer and improved seeds in Nigeria. The phenomenon could also be due to limited resources of farmers to purchase the subsidized fertilizer or a distrust of the Government procurement system of the past where poor quality fertilizer and seeds were distributed. The less than 100 percent redemption also reflects problems of mobile network depth and reliability at the time of redemption, difficulties of some farmers with the e-wallet, and inadequate supply of inputs at redemption centers.

Specifically, the following challenges and remedial measures for the GESS have been brought to the forefront in a bid to strengthen the process and to achieve better results:

a) *Limited coverage in rural areas by mobile phone networks*: This was a major problem faced by farmers at the redemption centers. Over 30 percent of farmers who turned out at redemption centers were unable to redeem subsidized fertilizer due to poor mobile phone network coverage. This problem is being resolved through installation of temporary masts by mobile phone companies during the rollout of GESS.

b) *Low density and coverage of Nigeria by functional agro-dealers*: Most of the upstream suppliers of agro-inputs do not have a national network of agro-dealers that can be relied upon for effective delivery of agro-inputs to every local government area (LGA) and ward in Nigeria. Their networks typically are concentrated in a few urban areas or states. This is an opportunity to leverage the GESS processes to create rural employment by stimulating the formation of agro-input dealer start-ups.

c) *Financial capacity of participating agro-dealers*: The GES program at minimum requires an agro-dealer to be able to finance at least two truckloads of agro-inputs in order to avoid out-of-stock problems at the redemption points. Two trucks of fertilizer cost at least ₦6 million. Most of the agro-dealers that are participating in GESS are unable to finance this level of inventory. The GESS program provides a lending opportunity for the financial sector. Unfortunately, the banks did not respond as desired. There needs to be a sensitization of banks to the potential of the program to significantly increase lending to the upstream agro-dealer sector.

d) *Slow provision of funding by banks to agro-dealers under the sovereign guarantee arrangement and low participation of the banks in the agro-financing component*: Only five banks eventually provided funds to agro-dealers and the loans made were given out late in the farming season. GESS is an opportunity to increase and improve the timing of lending to the agricultural sector. Banks have now seen that there is good business to be had in the upstream agricultural sector.

e) *Supply chain issues – inventory and logistics*: Upstream suppliers (producers and importers) of fertilizer and seeds could not consistently meet the demand for inputs at all redemption sites. Now that the basic structure of the national agro-input distribution system is in place, the 50 percent performance of suppliers to date will be increased by the appointment of supply chain managers to coordinate delivery of inputs.

f) *Upstream suppliers claims for GESS reimbursement from Government*: What happened was that suppliers demanded payment upfront from agro-dealers, who then had to demand reimbursement from the Government. The process that was set up for a larger claimant is now complicated for smaller claimants, like agro-dealers. This is a significant loss risk for small agro-dealers. There is an opportunity to simplify the payment processes and reconsider whether there are other options to pursue. These might include, for example, to escrow GESS funds to be administered by banks or to introduce an e-payment system based on redemptions.

g) *Farmer categorization*: States provided information on 4.3 million farmers. However, during implementation it emerged that quite a number of registered farmers were also involved in other parts of the farming business. This is being corrected through verification of the farmer lists in order to better capture authentic farmers.

h) *Desire of some states to use scratch cards in order to avoid the problems of limited mobile phone networks in the rural areas*: Upscaling the use of scratch cards will require a large number of human personnel and limit the cost-effectiveness of GESS. An alternative technology, the smart card technology, that can work both on-line and off-line, is being piloted by FMARD with technical support from a technology company from the UK, financed by the Department for International Development (DfID) of the United Kingdom (Adesina 2013).

The challenges currently being faced under the GESS are not unexpected in a reform program of its design and extensive scope. It is the belief of government that, once the challenges are addressed, the contribution of the program will be far more than what has been achieved so far. One area of contribution that has not been assessed is the impact of the GESS on beneficiary farmers. Thus, the broad goal of this study is to examine the impact of GESS on small-scale farmers in Nigeria, focusing on their input utilization, income, and productivity. The specific objectives are to:

1. Examine the application of ICT innovations in the implementation of GESS in the country;
2. Assess the performance of GESS implementation from inception to date;
3. Determine the factors influencing farmers participation in the GESS; and
4. Proffer measures for mainstreaming ICT usage for improved agricultural productivity in Nigeria.

1.1 Scope and study area

In this study, we consider information and communication technology (ICT) with regard to its role in promoting transformation within the agricultural economy, especially agribusinesses and value chain development. ICT solutions for agribusinesses and value chains typically fall under a relatively new area called information and communication technologies for development (ICT4D), which can also entail other types of development interventions in health and education (FAO 2013). This study will cover a subset of ICT4D, usually called ICT for agriculture. It will cover three basic categories.

1. ICT for production systems management, which comprises information that helps farmers improve their productivity, yields, and profitability and minimize their risks during the course of their normal business of growing agricultural produce.
2. ICT for market access services, which consists of any ICT service that facilitates beneficiaries' (especially farmers') access to information on subsidy delivery, pricing of agricultural products (inputs and outputs), and connections to and knowledge of suppliers, buyers or logistics providers, such as storage facilities (including redemption centers under GESS) and transport companies.
3. ICT for financial inclusion, which entails ICT solutions that allow formal financial institutions and direct value chain players to provide financial services in a more convenient, secure, flexible and low-cost manner than hitherto has been the case.

Specifically, the study covers ICT-related activities under GESS. It considers the FMARD portal and related agencies, such as supply chain managers. At the level of the farmer, the main analytical focus is on mobile phone services, which is the principal means of subsidy delivery under GESS.

1.2 Types and sources of data

Both primary and secondary data were collected between June and October 2014 in executing this study. The study employed both qualitative and quantitative data which were collected at meso and micro levels. The qualitative data were collected through in-depth interviews and focus group discussions (FGDs) involving officials associated with ICT components of GESS at federal and state levels. The quantitative data were obtained from publications, the Internet, and other relevant sources, as well as through structured questionnaires used to gather data from small-scale farmers on their production activities in 2013 - the immediate past production year at the time of data collection. Secondary data came from FMARD, Cellulant, and the International Fertilizer Development Center (IFDC), which is the lead supply chain manager under GESS. The types of data collected from the relevant sources are highlighted in Table 1.1.

In collecting the data, a multi-stage stratified random sampling approach was adopted. In the first stage, the country was stratified into the six geo-political zones, three of which are in the north and three in the south. One zone was purposively selected from the north (North-Central) and one from the south (Southwest) on account of the various GESS and ATA components being intensively implemented in the two zones. Thereafter, one state (Ogun) was selected from the southwest zone and one state (Niger) from the north-central zone. The states were stratified into LGAs, and five LGAs were randomly selected in each state. In the second

stage, the 2013 register of farmers was obtained from Cellulant, and the farmers in the study LGAs were stratified into GESS and non-GESS, i.e., those who benefited from the input subsidy through e-wallet and redeemed their inputs and those who did not. A random sample of 1,000 farmers was drawn from each group to give a total of 2,000 farmers included in this study.

Table 1.1—Description of types of information required from various sources

Data Sources	Nature of Information Collected
Federal Ministry of Agriculture and Rural Development (FMARD)	• Design and operation of FMARD's portal in key areas of farmers registration, input distribution, processing of payments, etc. • Interaction with Mobile Network Operators regarding (i) provision of channels and tariffs and (ii) ensuring that allocated bandwidth and network capacity is adequate • Expectations from farmers and extent to which such expectation have been realized in terms of digital registration and having access to SIM cards and cell phones. • Expectations from mobile service providers and extent to which such expectations have been realized. • Expectations from supply chain managers, including on ICT deployment and on the extent to which such expectations have been realized. • Expectations from the Federal Ministry of Communication and Technology and extent to which such expectations have been realized.
Cellulant Corporation	• Designing and building of the required ICT system to support GESS • Integration of all other stakeholders into the system • Provision of tools, reports etc. required by every participant in the system • Facilitation of private sector entry and participation • System linkage with FMARD
Supply Chain Managers (IFDC, Elcapemos)	• Responsibilities, ICT initiatives, challenges, and remedies
Farmers	• Activities during the farming cycle • Production costs and returns

Source: Author's compilation

1.3 Analytical framework for assessing factors determining farmers' participation in GESS

Both qualitative and quantitative techniques are employed in this study. The qualitative aspects are conducted at the level of FMARD, state governments, and supply chain managers. The key areas of investigation regarding ICT-enabled services include the following.

1. Improving access to financial services and mobile payment system, especially agriculture-related payment services.
2. Provision of agricultural information through mobile information platform and farmer helpline services.
3. Improving data visibility for supply chain efficiency with emphasis on mobile management of supplier and distribution networks.
4. Access to input and output market by enhancing the link between buyers and sellers of agricultural produce.

The data obtained from farmers are analysed both qualitatively and quantitatively. Essentially the participation of farmers in the GESS is examined with a view to ascertaining the main determinants of participation. A probit model is estimated to determine the key characteristics that influence participation in the GESS. Social, demographic and economic characteristics of the farmers are included in the model. The estimating equation is specified as follows.

$$y_i = \gamma_0 + \gamma_1 age + \gamma_2 hhsize + \gamma_3 gender + \gamma_4 farmexp + \gamma_5 nonfarminc + \gamma_6 qtyfert + \gamma_7 qtyseed + \gamma_8 hirelabor + \gamma_9 farmsize + \gamma_{10} riceyield + \gamma_{11} laborprod + \gamma_{12} famlaborprod + \gamma_{13} outputvaha + \gamma_{14} grossmargin + \gamma_{15} percapincome + \gamma_{16} remmittance + \varepsilon_i \quad (1)$$

where y_i is the participation variable with a value of unity for GESS participants and zero for non-participants. The explanatory variables are defined as follows:

age	age of farmer (years)
hhsize	household size
gender	dummy variable with a value of unity for male and zero otherwise
farmexp	farming experience (number of years of farming)
nonfarminc	nonfarm income (₦)
qtyfert	quantity of fertilizer used by farmer (kg)
qtyseed	quantity of seed used by farmer (kg)
hirelabor	number of hired workers
farmsize	farm size (ha)
riceyield	rice yield (kg/ha)
laborprod	labor productivity (value of total output per worker) (₦)
famlaborprod	family labor productivity (value of total output per family labor) (₦)
outputvaha	value of total output per hectare (₦/ha)
grossmargin	gross margin per hectare (₦/ha)
percapincome	gross margin per capita (₦)
remittance	dummy variable for transfer of income from household members in other locations, with a value of unity for receivers and zero otherwise
ε_i	error term

In the estimation, selected interactions and quadratic terms of these variables are also used.

In what follows, we analyze the implementation performance of GESS and present the results of the probit analysis in section three, while suggested policy actions follow in section four.

2. ANALYSIS OF IMPLEMENTATION PERFORMANCE OF THE GROWTH ENHANCEMENT SUPPORT SCHEME

This section examines the motivation for the design of the Growth Enhancement Support Scheme (GESS), its objectives, technology applications, and implementation performance from inception to 2014. The GESS was conceived between May and August 2011. Prior to this time, the Nigerian government had been investing significantly large sums of money annually to support farmers through providing subsidized inputs, but without seeing any impact on farm income and productivity. According to Akinboro (2014), as the spending by government on subsidised agricultural inputs grew, agricultural productivity dropped. It was obvious that the government's attempts to increase agricultural productivity in rural areas through direct involvement in the acquisition and distribution of farm inputs was not working.

In the early 2000s, attempts were made to find solutions to the limited number of farmers benefiting from the subsidy program and mitigate the inherent abuses. An important initiative in this regard was the voucher system to input delivery anchored by the International Fertilizer Development Center (IFDC). In 2001, IFDC commenced implementation of the three-year project known as Developing Agricultural Inputs Markets in Nigeria (DAIMINA). This USAID-funded project was the first to articulate a model to change the supply of inputs from being dominated by the government to a system in which the private sector could play a prominent role. The project demonstrated to government officials and stakeholders that input suppliers could be trusted to effectively market agricultural inputs through private sector channels. The project contributed significantly to improving policy and regulatory regimes related to agricultural inputs and introduced vouchers as an alternative to direct subsidies for fertilizer. Critically, DAIMINA showed how private suppliers and sellers could service demand under the appropriate enabling conditions, and how the government could play its role in establishing these conditions.

However, political forces and entrenched interests remained, thus preventing the real private sector from entering the market and developing mature supply channels. As a result, government officials were seen as the primary customer for input suppliers, rather than the rural farmer. In 2004, IFDC implemented pilot voucher programs on a limited scale in Kano, Bauchi, and the Federal Capital Territory (FCT). IFDC also coordinated two small-scale voucher programs in Kano and Bauchi in 2008. The objectives of the programs were to ensure that the subsidized fertilizer reached the targeted farmers, to improve the administration of subsidies by the federal and state governments, and to demonstrate the feasibility and cost efficiency of a private sector supply and distribution channel. These initial pilot interventions targeted about 5,000 participants and succeeded in demonstrating how "smart subsidies" could be administered in a very efficient, low-cost manner to reach smallholder farmers with fertilizer directly. Based on the success of the 2008 pilots, larger state-level model programs were launched in 2009. In that year, Kano and Taraba participated in statewide programs which provided targeted subsidies to about 30 percent of the smallholder farming populations in each state, 140,000 farmers in Kano and 70,000 in Taraba. The 2009 program built upon the lessons learned during earlier pilots and succeeded in demonstrating the large-scale applicability of fertilizer subsidy vouchers.

In 2010, the Fertilizer Voucher Program doubled in size to include Kano, Taraba, Kwara, and Bauchi. In point of fact, Taraba state signed a memorandum of understanding with IFDC to cover the whole state in 2010 and 2011. Also, in anticipation of future participation, Kaduna State sponsored a statewide survey, capturing approximately 100,000 farmers, and trained more than 150 extension staff. The implementation performance of the program in 2010 superseded that of 2009 in many areas, including improvement in the targeting of smallholder farmers with an expanded group of trained enumerators, streamlined database with better data entry accuracy, improved voucher redemption, increased recognition of distribution partner networks, and inclusion of states, such as Kaduna, that were not quite ready for a full-scale voucher program. According to IFDC (2013), the fertilizer voucher initiative was successful in depoliticizing fertilizer distribution. It also

strengthened the private-sector's agro-dealer network and provided farmers with high quality and affordable fertilizer.

Nonetheless, the scope of the programs was limited to just individual states, while the rest of the country continued on the path of direct procurement and distribution by government agencies. A complete transformation of the fertilizer procurement and distribution system came about in 2012 at the inception of GESS, which was part of government's ATA. Under GESS, which operates in every state of the country, participating farmers receive electronic vouchers – otherwise known as e-wallets – which entitle them to purchase a limited quantity of subsidized inputs directly from agro-dealers in their vicinity. In turn, agro-dealers collect the corresponding subsidy amount directly from the government.

Thus, GESS is a shift from the previous fertilizer market stabilization program to a new scheme that puts resource-constrained farmers at the center of input subsidy policy. The scheme delivers subsidized agricultural inputs to farmers through an electronic wallet, rather than paper vouchers, in which farmers use unique coded numbers that are delivered to their phones to redeem their input allocation from accredited agro-dealers. The new scheme is managed by a technical facilitator, Cellulant Ltd., that oversees the GESS technology platform through which farmers are registered and the input subsidy delivered.

GESS has four definitional details that describe its vision, structure, operational procedures, technology and potentials.

- In terms of vision, GESS is conceived and designed to lift 20 million smallholder farmers out of subsistence into self-sufficiency through a market-led approach to production, processing and marketing of agricultural products from the six geopolitical zones of the country in a four year period.
- As a scheme, GESS is structured in such a way as to disengage government from farm input procurement and distribution and shift the responsibility to private sector actors, such as banks, producers, distributors, agrodealers, and warehouse receipt operators to own and operate the value chain for farm inputs and outputs. As a package of processes and procedures for input subsidy delivery, GESS can be viewed as a set of business processes that allows public and private sector participants to identify farmers and link them to agro-dealers, financial institutions, and markets using the e-wallet technology, thereby creating a rule-based and predictable market relationship.
- Central to the GESS is the electronic wallet (e-wallet) which is the technology that brings together the concept, scheme and the processes and lays out a set of procedures to be followed in a structured way to deliver subsidized inputs to farmers. The wallet is the convergence point through which farmers receive the GESS facility from the federal and state governments and links them to agrodealers, input suppliers, financial institutions, and insurance schemes.
- The GESS is also viewed as a tool for the creation of viable market based on its potential to stimulate demand for fertilizer and improved seeds by putting a cash component of the product value directly into the hands of the farmers via e-wallets (Akinboro 2014).

The specific policy objectives of the GESS are to:

1. Target 5 million farmers annually for four years for the delivery of agricultural inputs on their mobile phones;
2. Provide direct support to farmers to enable them to procure agricultural inputs at affordable prices, at the right time, and at the right place;
3. Increase productivity of farmers across country through increased use of fertilizer—from 13 kg/ha to 50 kg/ha; and

4. Transform the role of government from direct procurement and distribution of fertilizer to a facilitator of procurement, regulator of fertilizer quality, and catalyst of active private sector participation in the fertilizer value chain.

It is expected that this scheme will improve agricultural input distribution and marketing. In addition, it should provide incentives to encourage actors along the fertilizer value chain to work together towards the common purpose of improving agricultural productivity, household food security, and incomes.

2.1 Technology applications in the implementation of Growth Enhancement Support Scheme in Nigeria

The electronic wallet system is at the heart of technology applications under the GESS. The e-wallet system is an ecosystem technology that ensures that a Nigerian farmer is able to receive farm input subsidy support from government through accredited agro-dealers; provides vital and relevant agro-information alerts; and is available to the agriculture extension system and participate in micro-lending and insurance schemes. Table 2.1 presents the key components of the ecosystem technology. (Also see Appendices 1 and 2.) All input retailers, seed, and fertilizer companies are on the GESS platform. Government support for farmers is sent to an escrow account at the Central Bank of Nigeria (CBN) for access by all participating commercial banks. Once farmers receive their subsidy support on their mobile phones, they will send the information to the agro-dealer of their choice. Once they pay the balance of 50 percent of the cost of seeds and fertilizers to the selected agro-dealer, the transaction is completed and the agro-dealer, seeds and fertilizer companies automatically get their accounts credited from the escrow account at the CBN.

Table 2.1—Components of the e-wallet system technology under the Growth Enhancement Support Scheme

GESS system component	Description
National farmer database	This component contains the results of the enumeration exercise conducted by government. This Oracle database contains 10.5 million farmer records so far and each farmer record contains on average 47 data objects ranging from identity, location, occupation, education, associations etc.
E-wallet system	This component manages the financial, supply chain, extension services, and messaging and operational aspects of the distribution of farm inputs. This component contains all the GESS system interaction data on all farmers participating in the program. This component generates an additional 80 data objects on every farmer.
Agro-dealer transaction management system	This is the component that renders transaction history reporting; farmer lists generation; analysis, and reconciliation reports.
Unique National Identity management module	This component manages through a direct interaction with NIMC the unique identity of Nigerian farmers under the Nigeria Agricultural Payment Initiative (NAPI) scheme.
Lending management module	This component provides accreditation on agro-dealers and suppliers. This is also the same module that is managing the direct lending to farmers and farmer groups.

Author's compilation from field survey, 2014

The GESS technology platform is advantageous to farmers, the government, and the private sector. It empowers farmers by providing them the ability to purchase inputs of their choice from the agro-dealer of their choice, as opposed to depending on government distribution channels, which are fraught with political biases in allocation of inputs. It promotes financial inclusion by farmers in line with the CBN's cash-less policy. For the government, the GESS platform has improved targeting of subsidized inputs to poor farmers. It has also improved transparency and accountability regarding the administration of the agricultural input subsidy, as it has become easier to track and monitor subsidy delivery to farmers. Furthermore, the GESS technology platform supports the deepening of private sector market development, as seeds and fertilizer companies build their supply chains to reach farmers directly, as opposed to the old system where suppliers delivered to government warehouses. It has also encouraged greater competition among private sector input suppliers in the distribution of inputs and allowed better marketing of inputs to meet the needs of farmers.

In October 2012, FMARD organized a review of GESS implementation. All stakeholders, including private sector suppliers, state Ministries of Agriculture and Natural Resources (MANR) and IFDC, were in attendance. During the review, it was found that the process of data capture was a major challenge, in that the full identity of farmers had been difficult to determine. IFDC reviewed the data process with a view to improving the situation to ensure greater transparency. Another issue that emanated from the 2012 GESS implementation review was the need to have supply chain management involved in the GESS process due to (i) inputs not getting to redemption centers on time, (ii) questionable quality of inputs supplied, (iii) poor inventory management on the side of agro-dealers, (iv) and the need for banks to have an independent entity to give them true reflection of inventory and redemption to avoid diversion of funds by agro-dealers. It was felt that use of organizations that have requisite experience in supply chain management could eliminate these challenges. The FMARD recruited supply chain managers (SCM) through competitive bidding. Three supply chain companies were engaged early in 2013, namely; IFDC (lead SCM), Jetlink Nig. Ltd., and Ecalpemos Technologies Ltd. IFDC was assigned 14 States plus FCT to manage, while the other two have 11 states each.

2.1.1 INTRODUCING TECHNOLOGY INTO FARMERS' ENUMERATION AND DATA ENTRY

The application of ICT in the registration of farmers was to address the challenge observed in 2012 regarding proper identification of farmers during the registration exercise. The objective of enumeration was to select farmers who will be eligible for receiving the subsidized inputs. At the federal level, the Department of Rural Development was charged with the design and implementation of the farmer registration process. However, each state had the responsibility of funding and overseeing the actual enumeration and registration of the farmers. In 2013, some states invested more than others in sensitizing farmers for the registration exercise, in allocating resources to their state ADPs or extension offices to carry out the process, and in supervising the process to ensure accuracy. Before 2012, which was the first year of implementation, there was no national database for farmers. Prior to the commencement of the nationwide farmers' enumeration, a pilot survey was done by IFDC in Dansadau in Zamfara state and a second one in Umunede in Delta state. The exercise was manually executed. It involved printing of forms which were distributed to farmers to fill out and return to designated enumeration centers for collection. The exercise was fraught with monumental challenges including excessive paper work; spelling errors due to lack of commonality in handwriting; multiple registration and fraudulent practices, since there was no way of verifying whether or not the person was a genuine farmer; tedious transcribing of data into a digital database; high costs per form; and the rush by data entry clerks to meet individual completion target, which often resulted in numerous human errors, including mistyping and omission of names.

The need to rectify these anomalies led to the introduction of the optical mark recognition (OMR) form by the government in 2013. A contract was awarded to Data Sciences to produce the forms and distribute them to all states. During enumeration, the farmer's information is filled into the OMR form by enumerators using HB pencils. The lower part of the form was detached and converted into a GESS farmer identification card to serve as a means of identification during the redemption exercise. After filling, the forms were gathered and sent to Data Sciences in Lagos, which used a machine scanner to capture the data from the forms for automatic transfer into the database; thus eliminating the need to transcribe the data. In order to receive an ID card, each individual was required to answer the enumerator's questions and provide a thumbprint and passport picture. Initially, the ID card was only to serve as verification of the farmers' identity during the redemption process. For example, it was envisioned that the farmer would go to the GESS agrodealer store designated in a text message the farmer received from Cellulant and show the text and his or her ID card. In point of fact the ID card was ultimately relied upon as the sole proof that a farmer was entitled to the subsidized inputs.

For the 2013 GESS, Data Sciences was responsible for data entry and subsequent data cleaning. Cleaning of data was supposed to include the removal of double entries and incomplete entries. In fact, some states reported significant differences between the number of OMR forms submitted to Data Sciences and the final number of farmers that ended up in Cellulant's database. Data Sciences's data entry process took several

weeks after which the data were sent to Cellulant for uploading into their database. Cellulant, however, reported that the data they received from Data Sciences were poorly managed and that little or no cleaning took place. Cellulant spent a few additional weeks to clean the data and detected several inconsistencies which prevented many farmers from being activated for redemption (IFDC 2013).

Cellulant put the registration list of farmers on its website from where GESS team leaders could log in and download the information for their states. The information was uploaded in such a way that farmers could be selected based on state, LGA, and ward. For each farmer the list contained the name, ID number, first four digits of mobile phone number required to be completed when the farmer arrives at the redemption center, the state, LGA, ward, and names of products which should be completed when the farmer collects the inputs at the redemption center. The use of the OMR technology revealed other gaps. Specifically, it did not capture farmers' biometrics. In some areas, farmers were removing the passport photos on the ID card and replacing them with the photo of another person, re-laminating it for the purpose of cheating the system. IFDC conducted an internal review of the process with a view to resolving these challenges. This led to the introduction of the GESS 'touch and pay' (TAP) technology.

2.1.2 TRANSITING FROM THE GESS TECHNOLOGY PLATFORM TO 'TOUCH AND PAY' (TAP) TECHNOLOGY

Although the GESS platform is still the dominant technology application for delivering subsidized inputs to farmers, a number of the inherent technical constraints have been addressed through the TAP technology, which in 2014 was at the pilot stage of application. The key challenges in the GESS platform being addressed by the TAP technology include paper-based registration, which often delays data entry and results in loss of data; limited network coverage; the fact that many farmers do not have mobile phones and so had to report manually, which often resulted in delayed payments. The TAP technology was approved by FMARD and a pilot phase was implemented by IFDC with funding from DFID in 2014. The goal was to ensure that all eligible Nigerian farmers have access to GESS inputs from private sector agrodealer shops utilizing state of the art mobile technology to connect on line and off line farmers to their local agrodealers even where there is no network coverage. Key features of the TAP are drop down menus, a global positioning system (GPS), a camera, and facilities for capturing biometrics. All of these contributed to greater transparency and better quality of data.

Compared with the GESS platform technology, the TAP system allows for real time data entry without any need for transcription or ownership of mobile phones. The TAP technology has built-in devices for fraud prevention and detection, and the operation allows for full weekly reconciliation reports to minimize errors. The system operates both online and offline and generates automated reports, which leads to faster reconciliation and quicker processing of payments. In areas without network coverage TAP depends on the near field communication (NFC) technology to operate. To register a farmer, the photograph of the farmer and ID card are taken, the biometrics and other necessary details are captured, and a TAP card is issued. This card will be used for subsidized input redemption. During input redemption, the farmer touches the agrodealer's tablet with the loaded TAP card and his photograph and biometric details appear on the screen of the tablet. The farmer pays the discounted amount balance and collects the inputs. The agrodealer is also able to track sales and available stock.

During the pilot exercise in FCT and Sokoto state in 2014, TAP was deployed for farmers' registration and input redemption. In the FCT, 200,000 farmers were targeted, while in Sokoto the target was 300,000 farmers, for a total of 500,000 farmers for the pilot exercise. All 62 wards in the six area councils of FCT were covered during a period of seven weeks. In Sokoto state 244 wards in 23 LGAs were covered in a period of eight weeks. The registration achievement in FCT was about 50 percent, while that of Sokoto was fully met. However, the redemption rate was better in FCT with 74 percent, compared with Sokoto state with 43 percent (Table 2.2). IFDC is exploring avenues for upgrading the technology to diversify its relevance and functions

under GESS. Design improvements being considered include agrodealer inventory management to improve continuity of input and making available accurate and timely financial and transaction reports to ensure faster settlement and to reassure banks of prompt loan repayments. Efforts also are being made to increase collaboration with the national identity management commission (NIMC) and CBN to accelerate the identity confirmation process and to increase the financial inclusion of farmers.

Table 2.2— Growth Enhancement Support Scheme 2014 'Touch and Pay' implementation

Location	Target Registration	Farmers Registered	Farmers Redeemed	Redemption Rate (%)
FCT	200,000	109,000	83,994	74
Sokoto State	300,000	398,000	172,292	43
TOTAL	500,000	507,000	256,286	51

Source: IFDC, Abuja

2.2 Growth Enhancement Support Scheme implementation performance

There are three key stages in GESS implementation ─ farmer enumeration, input redemption, reconciliation of records, and subsidy payment. After enumeration, farmer registers were prepared by Cellulant and sent to state directors of FMARD deployed in the 36 state capitals. Thereafter redemption started. It was flagged off in Ekiti state on 30 May 2012. Input suppliers made use of agrodealers distribution networks in the states. Some government warehouses were used as redemption centers (RCs). At the end of the redemption window, various documents were used for reporting what transpired at the RCs. These RC Forms formed the basis for payment to the agro-dealers. At the end of the redemption window period – usually 8-10 weeks – IFDC's figures were reconciled with that of Cellulant. IFDC then prepared the necessary documentation for various parties to sign off on – the state director for FMARD, the SCM, and the State Commissioner of Agriculture. The agro-dealers will attach this document to its payment request to the Federal Minister of Agriculture. The role of IFDC as the lead supply chain manager is that of a facilitator who ensures that none of the major stakeholders (FMARD, farmers, agro-dealers, banks) is short-changed in the input redemption process. According to the design of GESS, the registration target was to be 5 million farmers annually over a period of four years for a total of 20 million beneficiary farmers by 2015. As we shall see, considerable progress has been made in this regard since the inception of GESS.

2.2.1 MANAGEMENT OF GROWTH ENHANCEMENT SUPPORT SCHEME IMPLEMENTATION PROCESS

The need to put in place a solid management system for GESS implementation arose following the review of the 2012 implementation performance. It was the view of stakeholders that the use of supply chain management organizations could eliminate these challenges. Thus, FMARD engaged three of them through a competitive bidding process. Table 2.3 lists the states allocated to each of them. In the ensuing section the management activities of the SCMs and their interactions with other stakeholders in the input redemption process are examined.

Table 2.3—States covered by supply chain managers

Supply Chain Manager	States Covered
IFDC	Lagos, Oyo, Ondo, Delta, Edo, Anambra, Benue, Kwara, Niger, Bauchi, Taraba, Kano, Kaduna, Sokoto, FCT
Jetlink Nig. Ltd.	Adamawa, Cross River, Ebonyi, Ekiti, Imo, Kebbi, Osun, Plateau, Rivers, Yobe, Zamfara
Elcapemos Technologies Ltd.	Abia, Bayelsa, Borno, Akwa Ibom, Enugu, Kogi, Gombe, Nassarawa, Jigawa, Katsina, Ogun

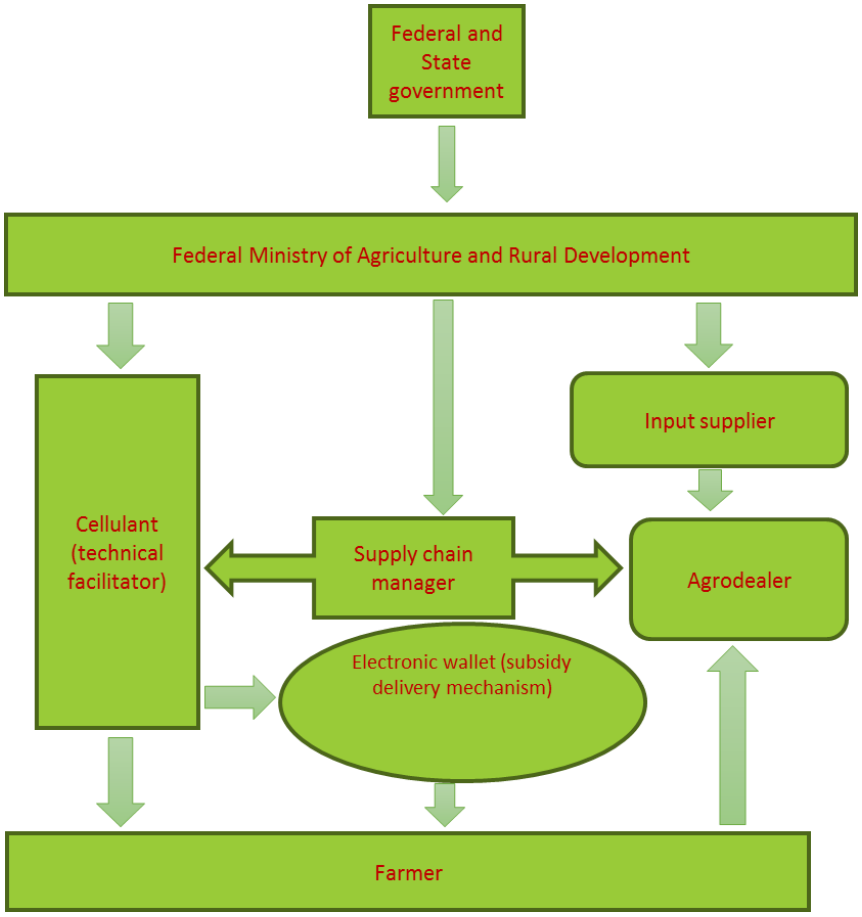
Source: Information compiled from IFDC, Abuja

The stakeholders associated with the GESS are small-scale farmers, private sector input suppliers, agrodealers, FMARD headquarters, directors of FMARD offices in the states, the state Ministries of Agriculture and Natural Resources, Cellulant, state GESS coordinators, and supply chain managers. With the exception of

FMARD headquarters and Cellulant, all other stakeholders have regular interactions in the course of implementing GESS. The framework for interaction is illustrated in Figure 2.1. The 50 percent subsidy granted to beneficiary farmers under the scheme is shared equally between the federal and state governments. FMARD is the coordinator and rallying point for all the activities and policies being implemented. The nature of interaction between FMARD and other actors and among the key actors themselves is implicit in the roles and responsibilities assigned to them (Table 2.4).

Although not a participant in the decision making process, the helpline staff (HLS) played a critical role during the redemption exercise when farmers received their inputs at the redemption centers. The HLS are also referred to as redemption center supervisors. They attend to farmers directly at the RCs. They educate the farmers on the redemption process, identify the farmers following established identification criteria, and assist them in redeeming their inputs. HLS take records of the redemption exercise at each RC and ensure that the agrodealers supply inputs to the farmers. They also manage crowd and crisis at the RCs. The SCM at the state capital is required by the head office to follow a rigorous reporting system that places great emphasis on proper record keeping and timely management of information. At the end of every working day, the HLS sends a report to the supervisor indicating the number of farmers that redeemed their inputs and the quantity of inputs involved. Every Thursday evening, supervisors collate all records and forward them to the SCM at the state headquarters. The following day, the SCM transmits the report to the headquarters of his company in Abuja.

Figure 2.1—Framework for stakeholders' interactions under the Growth Enhancement Support Scheme



Source: Author's illustration

2.2.2 THE INPUT REDEMPTION PROCESS

At the state level, the process of input redemption begins with the mapping out of the redemption centers. Next, is the preparation of the rollout template by the SCM in conjunction with the FMARD state office and the state Ministry of Agriculture and Natural Resources. The rollout template clearly presents the redemption centers, agrodealers, LGAs, and wards and the quantity of stock expected from each agrodealer. It also identifies the major suppliers who are to supply inputs to the agrodealers. Detailed information about the agrodealers and helpline staff and the quantity and prices of the various inputs – fertilizer, seeds, and chemicals – are provided.

Table 2.4—Roles and responsibilities of Growth Enhancement Support Scheme stakeholders

Stakeholder	Role and Responsibility
Small-scale farmers	• Are registered in the 2012 or 2013 GESS National Farmer Database. • Travel to the assigned GES Redemption center with their ID card or Mobile Phone. • Pay balance of input cost to the agro-dealer in order to obtain GES inputs at discounted prices.
Private sector input suppliers	• Meet FMARD's supplier selection criteria in order to participate as a registered, reputable company that provides high quality inputs. • Develop distribution supply channels to redemption center(s) that have been allocated and approved for GESS. • Ensure that sufficient quantity of inputs is supplied to the allocated redemption centers to meet the expected demand of farmers participating in GES.
Agrodealers	• Meet FMARD's agrodealer selection criteria, which are established to ensure that the private sector entities are willing and able to provide goods and services to farmers throughout the year. • Ensure adequate storage and security at the redemption center or agro-dealer shop. • Ensure sufficient staffing and normal working hours while GESS is operational (Mon. to Fri., 8 am to 5 pm).
FMARD	• Screen suppliers and confirm their eligibility according to the supplier selection criteria. • Screen agrodealer and confirm their eligibility according to the agrodealer selection criteria. • Organize national GESS technical working group to handle policy and state level issues. • Provide timely updates to State Directors, with copies to GESS coordinators and supply chain managers, based on implementation agreements from the GESS technical or working group.
FMARD – State Director	• Chair state technical working group, that includes SCM, GESS coordinator, and Cellulant representative, to meet on a weekly basis; • Approve mapping of new agrodealers from approved list as part of the state technical working group meeting. • Review offline farmer redemption logs at the weekly state technical working group meeting.
State Ministries of Agriculture and Natural Resources	• Screen suppliers and confirm their eligibility according to supplier selection criteria. • Screen agrodealers and confirm their eligibility according to the agrodealer selection criteria as part of the state technical working group.
State GESS Coordinator	• Attend weekly GESS technical working group meeting. • Monitor GESS redemption exercise. • Approve mapping of new agrodealer list as part of the state technical working group meeting. • Assist and support GESS sensitization and awareness creation efforts.
Supply Chain Manager	• Screen, select, hire, train, and supervise the GESS staff required to carry out the SCM's field activities, including, but not limited to helpline staff, zonal supervisors, and state team leader. • Mapping of approved agro dealers to redemption centers based on farmer density, accessibility, storage capacity, and security. • Provide regular progress reports on both enumeration and redemption.
Cellulant	• Print farmer register and hand over to the SCM state coordinator. • Weekly update of redemption by redemption centers. • State representative (non-governmental) to oversee technical or network issues.

Source: IFDC, 2014

Upon producing the rollout template, the SCM contacts the agrodealers through text messages to let them know their RCs, following which letters indicating the quantity of inputs to be supplied to the centers will be sent to them. Within two and three weeks, the agrodealers are expected to deliver inputs to the RCs, while the SCM mobilize the HLS to verify that all of the inputs have been delivered and conform to type, quantity, and quality specifications. During this period, the SCM commences the activation of farmers. This involves

sending text messages to farmers asking them to go to a particular RC and collect specified quantities of inputs. The RC is a warehouse (or store) where an agrodealer stores his products for sale to farmers. The messages are translated to local languages – Hausa, Ibo and Yoruba.

On arrival at the RC, the farmer is screened by the HLS. The farmer has to show the text message and his or her identity card, voter's card, or national identity card. Four out of the 11 digits of a farmer's phone number are missed out on the register and the farmer should be able to call them out as part of the verification exercise. In the absence of these means of identification, the farmer is identified by the village head or chairman of his group. For farmers who do not receive text message but appear at the RC and find their names on the register, the HLS will rely on the village head or group chairman for identification. In any case the name of the farmer must correspond with the name in the farmers' register at the RC. Once the farmer is cleared, the HLS will assist him to redeem the inputs. This involves creating a text message that is sent to Cellulant. HLS assist farmers by inserting the appropriate syntax in the message reflecting the name of the fertilizer, other relevant inputs, and the particular crop involved. In the case of the generic GESS, the seeds are rice and maize and the fertilizers are NPK and urea. The message hits the Cellulant portal and generates an immediate response to authorize the farmer to collect the indicated inputs. The farmer is then directed to the agrodealer to pay for the inputs for immediate collection. These transactions take place online with the use of the farmers' phones. In the case of farmers without cell phones, the agrodealers' phones are used for the redemption. In areas where there is no network coverage, the redemption is done using the point of sales (POS) payment system. The POS has all the required information about the farmer which the agrodealer can use for the redemption. Further details about the redemption process are provided in Box 1.

Box 1—Details of Growth Enhancement Support Scheme input redemption process

Beginning with farmer
On entering the redemption center, the farmer would go straight to the redemption supervisor. The farmer had to show his or her ID card, and the supervisor would check if the farmer is on the list. In case the farmer is not on the list, he or she would not receive any inputs and the procedure would end, even if the farmer could show a text message. However, later in the implementation of the scheme, it was decided that any farmer who could show a GESS 2013 ID card could receive agro inputs, regardless of whether they received a text or not.

Encounter with redemption supervisor – helpline staff
When the farmer's name appeared on the list, the supervisor would ask for his or her mobile number. On the list, the first four digits of the number were provided, and the supervisor would complete this number. Cellulant introduced the completion of the mobile number in a later stage of the project. After completing the phone number, the supervisor would ask the farmer if he or she had cash to pay for the agro inputs. In case the farmer did not carry enough money, the agro inputs could not be released. The farmer needed to come back another time with enough money.

After that, there were 4 different scenarios. Scenario 1 is the ideal scenario in full compliance with the GESS design.

1. The farmer showed his or her mobile phone with four text messages.
2. The farmer showed his or her mobile phone with one, two, or three messages.
3. The farmer showed his or her mobile phone without any messages.
4. The farmer had no mobile phone.

Linking up with Cellulant
In case the farmer had a mobile phone, irrespective of the number of messages, the supervisor looked up the ID number of the farmer in the farmers' list. Then the supervisor took the mobile phone of the farmer to send a text message. In case the farmer did not have a phone, the redemption supervisor would use his or her own mobile phone.

The text message sent to Cellulant depended on the inputs the farmer wanted:

- GES2 U N R for urea (U), NPK (N) and rice seeds (R)
- GES2 U N M for urea (U), NPK (N) and maize seeds (M)
- GES2 U R for only urea (U) and rice seeds (R)
- GES2 U M for only urea (U) and maize seeds (M)
- GES2 N R for only NPK (N) and rice seeds (R)
- GES2 N M for only NPK (N) and maize seeds (M)

In case a farmer wanted 2 bags of urea or 2 bags of NKP, there was no special code that could be sent. Therefore, the text GES2 U N R or GES2 U N M had to be used. It was not possible to take both rice and maize seed.

Often the message did not go through, even though the redemption center was within network coverage. In case the message did not go through, the inputs were released to the farmer and the redemption supervisor was tasked with re-entering the messages in the evening or weekend to see if they would go through. Instead of sending text messages, it was also possible to use interactive voice response that could be used by illiterate farmers. A code had to be dialed, after which the ID of the farmer had to be entered. Then a code had to be entered for a specific agro input. For each input, the whole procedure had to be repeated, meaning that if the farmer was to take 2 bags of fertilizer and 1 bag of seeds, 3 phone calls had to be made. Each time, a confirmation message was received. Although the interactive voice response was specifically meant for illiterate farmers, it was often used because it generally worked better than the text messages.

Use of toll free number
At the start of the project, the cost of the MTN text was 10 Naira, while for other networks it was 30 Naira. Farmers without a mobile phone had to pay between 50 and 100 Naira to the redemption supervisor to cover the text messaging costs. Because the government did not want farmers to pay extra for the text message, later a toll-free number (38145) was introduced for MTN only.

Confirmation message from Cellulant
After sending the text message indicating the inputs the farmer wanted to purchase, Cellulant's platform should have automatically sent a confirmation message with a reference number. When the platform worked, the supervisor would then write on the farmers list this reference number adjacent to the corresponding name. The agro dealer would receive a message to release the inputs to the farmer. Simultaneously, the message was relayed to the farmer confirming that he or she should proceed and pay for the inputs. Often the confirmation message was not received until much later. In that case, the farmer could still collect the inputs. The redemption supervisor should have crossed the name of the farmer to indicate that this person had collected agro inputs. In case there was no network, offline redemption could be used to redeem agro-inputs. In that case, the name and ID card were checked and the details on the agro-inputs that were redeemed were entered in a notebook. The moment the network was reestablished, the redemption supervisor could send all the text messages.

Handing over of inputs
After the confirmation messages were received, the farmer could go to the agro-input dealer to collect the inputs. Because often the text messages did not go through or no confirmation message was received, farmers could also collect their inputs even though no confirmation message was received. The farmer paid the commercial price minus the GESS discount amount and received the inputs. Some agro-dealers issued receipts, while others did not. In case no receipt was issued, the dealer kept records in a ledger. Ideally, all inputs would be available at the redemption center at the same time, thereby reducing the number of trips a farmer would need to travel to the RC to pick up the inputs. Although this was the ideal situation, there were a number of cases where farmer had to collect the products piecemeal. The farmer could only take seeds if he or she bought fertilizers. Farmers had to pay cash. It was not possible to redeem inputs on credit. It was prohibited to resell the received inputs. Although this was the rule, it was observed in a few cases that farmers sold their inputs, even at the redemption center.

Reconciliation
At the end of the day, the supervisor and agro dealer compare the number of fertilizer and seed bags that were given to farmers. Every week, the redemption supervisor reports to the zonal supervisor on the closing stock and the number of bags redeemed by farmers. This was sent to the State Team Leaders and reported to IFDC, where all information was put together and send to the Ministry of Agriculture. At the end of the redemption period, for every state, a certificate of honor had to be signed by the redemption supervisor (helpline staff), the representative of the state director, and the representative of state GES coordinator. The waybill and the farmers' list with all ticked names were added and all documents were sent to Cellulant. If everything was done well, the information from Cellulant should have matched the information from the redemption centers.

Source: IFDC, Abuja

2.2.3 PERFORMANCE OF THE GROWTH ENHANCEMENT SUPPORT SCHEME

This section undertakes an assessment of GESS implementation performance using three indicators: (1) effective rate of participation in the subsidy program; (2) input redemption rate; and (3) proportion of farmers targeted. The effective participation rate is the number of farmers who redeemed their subsidy vouchers as a percentage of the number of farmers registered; while the redemption rate is the number of farmers who redeemed subsidy vouchers as a percentage of the number of farmers targeted for the input subsidy. The third indicator is the number of farmers targeted expressed as a percentage of the number of farmers registered. It

is a measure of the extent to which the government addressed the issue of inclusiveness in implementing the GESS.

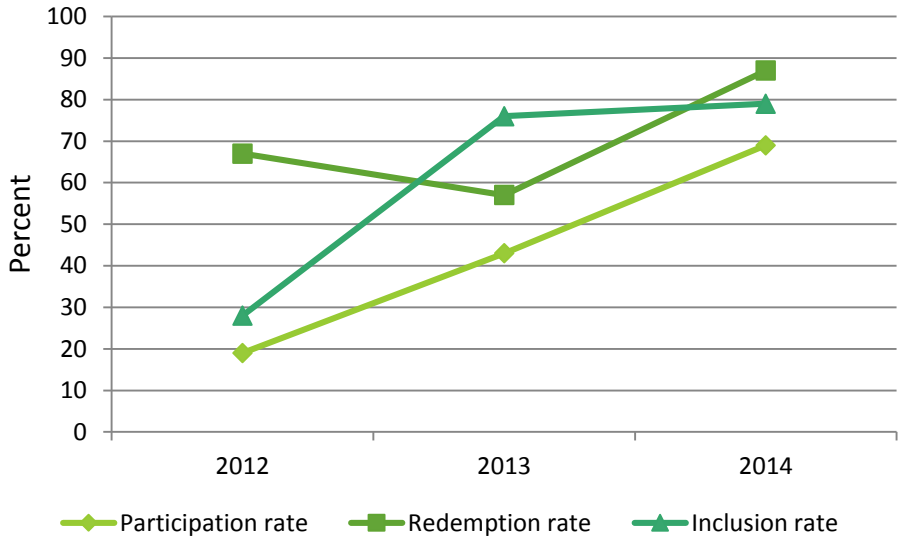
The process of targeting farmers to benefit from the input subsidy program under the GESS started with the registration of 3.91 million farmers in 2012. The number increased to 9.5 million in 2013 and 10.47 million in 2014. The number of farmers targeted for the subsidy benefit also continued to increase from 1.09 million in 2012 to 7.24 million in 2013 and 8.30 million in 2014 (Table 2.5). As shown in Figure 2.2, the proportion of registered farmers being targeted for the subsidy program trended upwards, but at a decreasing rate, from 2012 to 2014. The redemption rate decreased from 67 percent in 2012 to 57 percent in 2013, but increased to an all-time high of 87 percent in 2014. However, the effective participation rate has been growing at an increasing rate over the period.

Table 2.5—Farmers' participation in the Growth Enhancement Support Scheme in Nigeria

Year	Farmers Registered (a)	Farmers Targeted (b)	Farmers Redeemed (c)	Participation Rate (%) [(c)/(a)]*100	Redemption Rate (%) [(c)/(b)]*100	Rate of Farmers' Inclusion, (%) [(b)/(a)]*100
2012	3,907,445	1,093,113	728,736	19	67	28
2013	9,511,674	7,236,274	4,121,091	43	57	76
2014	10,470,589	8,304,803	7,223,070	69	87	79

Source: Olomola 2014.

Figure 2.2—Trend in Growth Enhancement Support Scheme implementation in Nigeria



Source: Olomola 2014.

In a recent study, Olomola (2014) found significant variation in the performance indicators across the geopolitical zones, but they are generally skewed in favor of the agriculture-dependent zonal economies. For instance, on an annual basis, the share of registered farmers is higher in the north (69, 67 and 69 percent in 2012, 2013 and 2014, respectively) than in the south (32, 33 and 32 percent, respectively). During the first year of GESS (2012), 90 percent of the beneficiaries (farmers who redeemed their inputs) came from the three northern geopolitical zones, compared with 9 percent from the three southern zones. In 2012, the lowest inclusion rates were recorded in the southern zones. Despite increases in the inclusion rates in 2013 and 2014, the percentage of redeemed farmers was much lower in the southern zones than the northern zones. Persistently, the Northwest zone recorded the highest share of 53, 32 and 32 percent in 2012, 2013 and 2014, respectively, compared with the Southwest, which recorded the lowest share of 3, 5 and 8 percent, respectively. The Southwest also recorded the lowest participation rate and redemption rate in 2013 and 2014. The Northwest has the

highest participation rate (54 percent in 2013), while it was second to the South-South in 2014. Contrary to expectations, a more even distribution of the inclusion rates among the geopolitical zones in 2013 and 2014 has not been associated with high participation rates in the southern geopolitical zones, especially in 2013.

Moreover, the divergence between the desired rate of participation and effective rate of participation continues to widen in 2013 and 2014 compared with the situation in 2012. This is an indication of the difficulty in maintaining the redemption rate at a high level over the period. Olomola (2014) also found that the desired participation rate (subsidy inclusion rate) and effective participation rate have been rising in each of the geopolitical zones from 2012 to 2014. At the same time, the share of subsidized inputs has also been much higher in the north than the south on an annual basis (Table 2.6). The foregoing is a reflection of the fact that the economy of the northern zones is largely agrarian. Thus, it is not surprising that the call on the farmers to register and to redeem their inputs elicited huge response from the various northern states. After having frequently been swindled by middlemen in the past; northern farmers were enthusiastic to participate in GESS, which not only guarantees direct access to fertilizer, but also allows farmers to purchase the input at a subsidized price.

Table 2.6—Comparison of regional share of Growth Enhancement Support Scheme participants and share of inputs, percent

	2012			2013			2014		
Zone	Redeemed	Seeds	NPK	Redeemed	Seeds	NPK	Redeemed	Seeds	NPK
Northwest	53	61.2	70.5	32	34.2	30.2	32	33.5	33.1
Northeast	16	5.5	11.3	24	26.3	23.2	22	23.1	19.6
North-Central	21	13.8	12.2	21	20.1	20.7	18	18.5	18.3
Southwest	3	1.8	2.1	5	5.1	5.0	6	5.9	6.3
Southeast	3	0.6	2.0	8	7.9	8.0	8	7.4	9.1
South-South	3	17.1	1.9	10	6.4	12.8	13	11.5	13.6
All zones	100	100.0	100.0	100	100.0	100.0	100	100.0	100.0

Source: Olomola 2014.

As the implementation of GESS progressed, compliance with the input allocation criteria rose to the highest level, as evidenced by the comparison of the regional share of participating farmers with the share of inputs (Table 2.6), the quantity of fertilizer received by a farmer in each of the states (Table 2.7), and the share of subsidy payment by the federal government (Table 2.8). The expected balance between the regional share of farmers who redeemed their vouchers and the share of total inputs redeemed in each of the geopolitical zones did not occur in 2012, ostensibly in view of the fact that GESS took off during the year and full compliance might have been stymied by initial difficulties in adjusting to a new scheme. Thus, in 2012, 53 percent of the farmers who redeemed their inputs in the Northwest obtained 61 percent of seeds and 71 percent of fertilizer (NPK). This distribution seems out of proportion compared to other zones, where the share of inputs fell sharply below the share of participating farmers; with the exception of the South-South, which also experienced a disproportionate distribution in which 3 percent of the farmers received 17 percent of the seeds. The observed imbalances may have resulted from the distribution in seven states where the average quantity of fertilizer received by a farmer varied from the target.

With better targeting of farmers, improved management of supply chains, and monitoring of input distribution from 2013, it has been possible to achieve significant improvement in compliance with input allocation criteria and better access to inputs by farmers. As shown in Table 2.5, the observed imbalance in 2012 was minimized in 2013 and, to a large extent, the share of inputs received in each of the geopolitical zones is commensurate with the share of participating farmers. In the case of fertilizer, compliance reached the highest level, judging by the number of bags received by a farmer in each of the states. As a matter of policy, each farmer under GESS is guaranteed access to two bags of fertilizer and a bag of seed– either maize or rice. Available data indicate that each of the redeemed farmers had access to two bags of fertilizer, especially in

2013 and 2014. This is an improvement over the situation in 2012 when it was not possible to ensure full compliance at the inception of GESS; especially in Delta, Edo, Ekiti, Katsina, Kwara, Osun and Taraba states (Table 2.6).

Compared with the situation before GESS, access to fertilizer by small-scale farmers witnessed considerable improvement under the ATA. Indeed, during the pre-ATA era it would not have been possible to access fertilizer distribution data that would permit a determination of the quantity of fertilizer received per farmer, let alone ascertaining the share of each state on an annual basis, for any meaningful policy action. The sustenance of full compliance with the stipulated quantity of fertilizer accessible to a farmer for two consecutive years (2013 and 2014) years is at the heart of the satisfaction accorded GESS by farmers, policy makers and analysts. Indeed, it is a validation of the success achieved so far under the scheme.

Table 2.7—Fertilizer distribution under the Growth Enhancement Support Scheme, by state

State	2012			2013			2014		
	Farmers Redeemed	Quantity of fertilizer (50Kg bags)	Fertilizer/ Farmer (50Kg bags)	Farmers Redeemed	Quantity of fertilizer (50Kg bags)	Fertilizer/ Farmer (50Kg bags)	Farmers Redeemed	Quantity of fertilizer (50Kg bags)	Fertilizer/ Farmer (50Kg bags)
Abia	5,413	10,280	2	118,054	236,109	2	186,872	373,744	2
Adamawa		-	-	137,607	275,214	2	193,696	387,392	2
Akwa Ibom	100	200	2	114,807	225,047	2	261,776	523,552	2
Anambra	6,034	12,620	2	77,221	146,322	2	148,010	296,020	2
Bauchi	53,203	114,680	2	336,271	672,640	2	589,706	1,179,412	2
Bayelsa	192	300	2	54,146	108,292	2	115,486	230,900	2
Benue	29,881	59,520	2	176,512	334,887	2	213,590	427,180	2
Borno	6,828	13,660	2	95,722	187,005	2	222,505	445,010	2
Cross River	15,866	30,260	2	93,245	186,490	2	174,931	349,862	2
Delta	2,815	7,940	3	80,703	158,506	2	169,928	339,856	2
Ebonyi	5,591	11,060	2	55,818	111,636	2	105,252	210,504	2
Edo	2,433	3,220	1	49,090	91,755	2	133,761	267,522	2
Ekiti	3,115	11,360	4	46,239	91,308	2	39,610	79,220	2
Enugu	1,636	2,640	2	51,250	102,501	2	116,162	226,029	2
FCT	36,146	71,920	2	92,808	179,648	2	83,994	167,988	2
Gombe	51,232	102,460	2	126,790	251,261	2	152,722	305,444	2
Imo	5,107	10,060	2	23,763	43,615	2	34,611	69,222	2
Jigawa	100,513	199,820	2	110,958	221,818	2	199,190	398,380	2
Kaduna	81,000	162,000	2	416,556	815,378	2	418,312	916,917	2
Kano	125,291	250,580	2	250,389	500,777	2	435,853	871,706	2
Katsina	50,856	996,220	20	93,676	187,352	2	245,074	490,148	2
Kebbi	8,588	17,180	2	112,168	224,336	2	271,327	542,654	2
Kogi	14,204	28,440	2	128,356	247,328	2	187,304	374,608	2
Kwara	9,520	2,780	1	65,616	129,183	2	171,029	342,058	2
Lagos	2,179	4,360	2	15,814	27,191	2	17,814	35,628	2
Nassarawa	26,505	54,240	2	68,554	131,014	2	63,130	126,260	2
Niger	29,892	57,040	2	114,146	228,291	2	228,713	457,426	2
Ogun	3,048	5,880	2	22,185	44,370	2	66,218	132,436	2
Ondo	1,858	3,680	2	17,519	34,183	2	68,426	136,900	2
Osun	2,232	5,620	3	18,000	35,820	2	111,243	222,486	2
Oyo	11,006	18,460	2	90,959	174,896	2	127,834	256,806	2
Plateau	8,119	15,000	2	199,693	399,386	2	362,805	725,610	2
Rivers	1,177	2,460	2	34,270	65,187	2	95,021	190,042	2
Sokoto	18,041	35,720	2	198,107	396,215	2	298,505	597,010	2
Taraba	7,503	36,320	5	187,128	351,572	2	304,740	609,480	2
Yobe	62	120	2	125,377	250,754	2	151,011	302,022	2
Zamfara	1,550	2,920	2	121,574	237,189	2	456,909	913,818	2
Total	**728,736**	**2,361,020**	**3**	**4,121,091**	**8,104,475**	**2**	**7,223,070**	**14,521,252**	**2**

Source: Author's computation using data from FMARD, Abuja.

Table 2.8—Distribution of federal government spending on fertilizer subsidy under the Growth Enhancement Support Scheme

	2012			2013			2014		
	Quantity of fertilizer (50Kg bags)	Subsidy Payment ('000s ₦)	Share (%)	Quantity of fertilizer (50Kg bags)	Subsidy Payment ('000s ₦)	Share (%)	Quantity of fertilizer (50Kg bags)	Subsidy Payment ('000s ₦)	Share (%)
Abia	10,280	28,270	0.4	236,109	649,299	2.8	373,744	1,027,796	2.5
Adamawa	-	-	-	275,214	756,838	3.3	387,392	1,065,328	2.6
Akwa Ibom	200	550	0.0	225,047	618,878	2.7	523,552	1,439,768	3.5
Anambra	12,620	34,705	0.5	146,322	402,385	1.8	296,020	814,055	2.0
Bauchi	114,680	315,370	4.7	672,640	1,849,761	8.1	1,179,412	3,243,383	7.9
Bayelsa	300	825	0.0	108,292	297,803	1.3	230,900	634,975	1.5
Benue	59,520	163,680	2.5	334,887	920,939	4.0	427,180	1,174,745	2.9
Borno	13,660	37,565	0.6	187,005	514,263	2.2	445,010	1,223,778	3.0
Cross River	30,260	83,215	1.3	186,490	512,848	2.2	349,862	962,121	2.3
Delta	7,940	21,835	0.3	158,506	435,893	1.9	339,856	934,604	2.3
Ebonyi	11,060	30,415	0.5	111,636	306,999	1.3	210,504	578,886	1.4
Edo	3,220	8,855	0.1	91,755	252,327	1.1	267,522	735,686	1.8
Ekiti	11,360	31,240	0.5	91,308	251,097	1.1	79,220	217,855	0.5
Enugu	2,640	7,260	0.1	102,501	281,877	1.2	226,029	621,580	1.5
FCT	71,920	197,780	3.0	179,648	494,032	2.2	167,988	461,967	1.1
Gombe	102,460	281,765	4.2	251,261	690,967	3.0	305,444	839,971	2.0
Imo	10,060	27,665	0.4	43,615	119,943	0.5	69,222	190,361	0.5
Jigawa	199,820	549,505	8.3	221,818	610,001	2.7	398,380	1,095,545	2.7
Kaduna	162,000	445,500	6.7	815,378	2,242,290	9.8	916,917	2,521,522	6.1
Kano	250,580	689,095	10.4	500,777	1,377,137	6.0	871,706	2,397,192	5.8
Katsina	996,220	2,739,605	41.2	187,352	515,219	2.2	490,148	1,347,907	3.3
Kebbi	17,180	47,245	0.7	224,336	616,923	2.7	542,654	1,492,299	3.6
Kogi	28,440	78,210	1.2	247,328	680,153	3.0	374,608	1,030,172	2.5
Kwara	2,780	7,645	0.1	129,183	355,253	1.6	342,058	940,660	2.3
Lagos	4,360	11,990	0.2	27,191	74,775	0.3	35,628	97,977	0.2
Nasarawa	54,240	149,160	2.2	131,014	360,287	1.6	126,260	347,215	0.8
Niger	57,040	156,860	2.4	228,291	627,801	2.7	457,426	1,257,922	3.1
Niger	57,040	156,860	2.4	228,291	627,801	2.7	457,426	1,257,922	3.1
Ogun	5,880	16,170	0.2	44,370	122,018	0.5	132,436	364,199	0.9
Ondo	3,680	10,120	0.2	34,183	94,003	0.4	136,900	376,475	0.9
Osun	5,620	15,455	0.2	35,820	98,505	0.4	222,486	611,837	1.5
Oyo	18,460	50,765	0.8	174,896	480,963	2.1	256,806	706,217	1.7
Plateau	15,000	41,250	0.6	399,386	1,098,311	4.8	725,610	1,995,428	4.8
Rivers	2,460	6,765	0.1	65,187	179,265	0.8	190,042	522,616	1.3
Sokoto	35,720	98,230	1.5	396,215	1,089,591	4.8	597,010	1,641,778	4.0
Taraba	36,320	99,880	1.5	351,572	966,822	4.2	609,480	1,676,070	4.1
Yobe	120	330	0.0	250,754	689,572	3.0	302,022	830,561	2.0
Zamfara	2,920	8,030	0.1	237,189	652,270	2.8	913,818	2,513,000	6.1
Total	2,418,060	6,649,665	100.0	8,332,766	22,915,108	100.0	14,978,678	41,191,365	100.0

Source: Olomola 2014

2.3 Growth Enhancement Support Scheme implementation challenges

Despite the opportunities presented by the implementation of GESS, especially in terms of increased demand for farm inputs, rising investment in input production, and financing opportunities for the banking sector, the achievements have been affected by several constraints. For better analysis and understanding, these constraints are categorized into administrative, technical, manpower-related, political, financial, operational, and farmer-related.

2.3.1 ADMINISTRATIVE CONSTRAINTS

Administrative issues arose in the way FMARD targets potential beneficiaries. The final farmer lists prepared by Cellulant and sent to the various states were often inundated with errors. For instance, for 2013 GESS operations, while some farmer names were repeated several times on the list, others that were enumerated and were presented with authentic GESS ID cards did not appear on any list. Moreover, the ID numbers sent by text messages from Cellulant to farmers did not correspond with those on the famers' list. Names of farmers in a state in the south sometimes showed up in the north and vice versa. These challenges ended up bringing the redemption rate lower than expected despite availability of inputs. Furthermore, the roll out dates for each redemption center was set before the actual roll out information was submitted to Cellulant, contrary to the laid down procedure. Thus, it could take up to two weeks before the redemption center was activated. In some cases the period between the sending of the roll out data and the actual roll out was too short, causing problems during the roll out.

2.3.2 TECHNICAL CONSTRAINTS

Many of the technical constraints were associated with the activities and responsibilities of Cellulant, the technical facilitator for GESS. In principle, Cellulant's technology platform should operate where there is network coverage; but in practice, the platform worked less than 50 percent of the time. Often farmers did not receive any text message or they received fewer than the four messages sent by Cellulant. Cellulant's response to any complaint about their system was defensive rather than corrective. Instead of finding a solution, often another actor was blamed by Cellulant for the problem. The workload for technical staff appeared to be too heavy; thus causing extreme delays in solving certain problems. In the overall set up, many delays in dealing with challenges were reported, which suggested that 36 states and the complicated system were too much for Cellulant to handle (IFDC 2013).

2.3.3 MANPOWER CONSTRAINTS

The manpower constraints relate not only to inadequacy of personnel for managing and monitoring the RCs, but also to the timeliness of training for the required staff and equipping them with the necessary skill to enable them to discharge their responsibilities during the redemption exercise. In 2013, when the training program to prepare all staff took place, some of the procedures laid down by Cellulant were not clear to the staff. Thus, the content of the training program required frequent updating every time Cellulant had to provide new information. Moreover, some members of staff were not fully prepared and sufficiently knowledgeable on what needed to be done due to change of GESS procedures during the course of the program. In each state, redemption supervisors, agrodealers, and state officials were trained at the same time. According to IFDC (2013), the groups were very large (more than 50 participants) in some states, making the training less effective. For each state, three zonal supervisors were appointed, irrespective of the number of redemption centers per state. The number of redemption centers varied between 11 and 65 per state. This implied that some zonal supervisors were overloaded. It was also observed that no criteria were used to select redemption supervisors, with the result that not all redemption supervisors performed their duties as they should have.

2.3.4 POLITICAL CONSTRAINTS

Even though input distribution under the scheme was to be carried out by the private sector, there were cases of interference in the redemption process by government officials in some locations. The selection of agrodealers and creation of redemption centers in some places was politically motivated. Sometimes the government wanted to shift dealers from one LGA to another, while there was a good agrodealer in that LGA. Most ADP warehouses that were used as redemption centers were staffed by government staff and not by an agrodealer.

2.3.5 FINANCIAL CONSTRAINTS

Due to limited access to bank loans, the volume of business of some agrodealers was rather low. Funding was not regular for the FMARD programmes and activities in the state. FMARD state offices faced financial difficulty as more GESS responsibilities piled up, more value chains were developed, and the maintenance of facilities required more funds. Many states also lack adequate financial capacity to meet the funding of the subsidy payment. Many redemption supervisors were not paid in a timely manner, resulting in low morale and abuse of redemption procedures.

2.3.6 OPERATIONAL CONSTRAINTS

The implementation of GESS faced several operational challenges which can be examined broadly in three areas ─mishandling of farmers' identification, poor mapping of farmers, and redemption bottlenecks. The details of the constraints relating to each category derive from the observations and review undertaken by IFDC, the lead supply chain manager for the 2013 GESS (IFDC 2013).

Mishandling of farmers' identification – During enumeration, farmers received an identity card on the spot. Some farmers were removed from the list for several reasons, but still kept the ID card with which they could claim agro-inputs. Sometimes the ID number received by the farmer did not match the number on the farmer list. Cellulant told the redemption supervisor to use the ID number on the list.

Poor mapping of some farmers – Access to the list of farmers often posed a considerable challenge. In 2013, the list was uploaded to the website of Cellulant by ward, to be downloaded by the Abuja IFDC office and, in some cases, state team leaders. Due to slow internet connections, it took a long time to download all wards, especially for states with many wards, e.g., Kano with 481 wards. There was no clear deadline for closing the farmers lists, and updated lists were not always sent to redemption supervisors. Because of this, some redemption centers were overloaded with farmers because the selection of centers was based on number of farmers. In addition, some farmers received text messages to collect inputs but did not appear on the list in the redemption center. Because the list did not contain the name of the redemption center, the State Team Leaders had to look at the wards and number of farmers to see to which redemption center the lists belonged. This took time. In addition, some farmers were allocated to redemption centers far away. Although the database was cleaned by Cellulant, it still contained contaminated data. For Lagos, some names appeared twice (in case the ID number was different, this indicated two different persons with the same name). When Cellulant was contacted about this, Cellulant worked on the list, but even after this cleaning effort names were still repeated up to five times in some areas.

Redemption bottlenecks – There were several recurring challenging issues that arose when farmers redeemed their inputs using their subsidy e-vouchers.

- Because the reply messages of Cellulant often came with a very long delay – some messages arrived the next day or not at all – it took a long time to assist farmers, resulting in long queues.
- It was not clear to all redemption supervisors if farmers were allowed to take 2 bags of NPK or 2 bags of urea instead of 1 bag urea and 1 bag NPK. Some supervisors thought this was only possible if either urea or NPK was no longer in stock.
- Because there was no special text in case a farmer wanted to have 2 bags of urea or 2 bags of NPK, the data of Cellulant on the quantity of bags (of urea and NPK) released to the farmer was not accurate.
- There was a shortage of rice and maize seed, so the quantity each farmer could get was cut in half. This caused problems because farmers did not believe the explanation given by officials and accused some redemption supervisors and agro dealers of fraud. This mistrust was exacerbated by

the fact that the change was not officially communicated by FMARD or NASC to state-level counterparts. Instead, supply chain managers were tasked with passing this directive on to the beneficiary farmers, which caused protocol problems.

- Not all dealers kept good records or issued receipts. This caused some disputes when results were compared at the end of the day.
- Not all redemption supervisors acted as supervisors. Instead they put the agrodealer in charge and permitted the agrodealer to take home the farmers' list in the evening.
- Although it was prohibited to redeem inputs on behalf of someone else, this still happened.
- Because redemption supervisors used their personal SIM card, it was sometimes difficult to retrieve information that was stored on the SIM card afterwards.
- For the value chain GESSs, a separate phone number (or SIM card) was needed for each LGA and for each value chain. This means that a redemption supervisor had at least 20 phone numbers to work with.
- Difficulty in reaching farmers without mobile phones. Since no budget was made to inform farmers without mobile phones, not all eligible farmers were reached.
- Farmer should have received four text messages from Cellulant, but this almost never happened.

2.3.7 FARMER-RELATED CONSTRAINTS

Among farmer-related constraints affecting the quality of GESS implementation were the following:

- Some farmers deleted the text messages that they received from Cellulant at home so they could not be shown at the redemption center when they went to collect their subsidized inputs.
- The generally low disposable income of rural farmers affected their ability to procure inputs, e.g., the GESS package for cotton required a farmer to pay a contribution for the inputs of about ₦27,000, which many farmers cannot afford.
- In some cases, farmers already activated their numbers at home after receiving message 3, which is the message that contains a confirmation number. When these farmer arrived at the redemption center, it appeared as if he or she had already collected the inputs. The only way to check was to see if the farmer's name was crossed in the farmers list.
- Some farmers resold their inputs at the redemption center.

In addition to the above specific constraints, there are other general challenges which require attention in order to improve the performance of the GESS. They include a lack of telephone coverage in most rural settings; and the distances between villages making prohibitive the cost of travel to redeem inputs, which may discourage farmers from redeeming their e-vouchers for inputs, resulting in a lower redemption rate for the scheme.

3. PARTICIPATION OF FARMERS IN THE GROWTH ENHANCEMENT SUPPORT SCHEME

This section examines the socioeconomic characteristics of GESS beneficiary farmers and determines the factors influencing their participation in GESS.

3.1 Factors affecting farmers' participation in the Growth Enhancement Support Scheme

The analysis of farmers' participation in GESS begins with a description of some of their social (gender, location, education), demographic (age, marital status, household size), and economic (occupation, household income, farm size) characteristics. These characteristics are important in understanding the differences in the socio-economic status of the farmers who are participating in the GESS compared with their non-participating counterparts. Of the 2000 farmers included in the study, 63 percent are males while 37 percent are females. Each gender group is distributed almost equally between the north and south (Table 3.1). About 28 percent of the male farmers are in the urban areas compared with 72 percent in semi-urban and rural areas. A higher proportion of females are in urban areas – 36 percent compared with 64 percent in the semi-urban and rural area. Of the 2000 respondents in the study, 30 percent are in urban areas, 30 percent in rural areas while 40 percent can be classified in semi-urban areas. Both male and female farmers are largely married. The female farmers are less educated, but younger than their male counterparts.

Table 3.1—Distribution of respondents by gender

	Male farmers		Female farmers	
	Number	Percent	Number	Percent
Region				
North	740	50.7	260	48.1
South	719	49.3	281	51.9
Total	1459	100.0	541	100.0
Community				
Urban	403	27.6	197	36.4
Semi-urban	604	41.4	196	36.2
Rural	452	31.0	148	27.4
Total	1459	100.0	541	100.0
Educational status				
No formal education	493	33.8	244	45.1
Primary school	345	23.6	118	21.8
Secondary school	388	26.6	111	20.5
Tertiary education	233	16.0	68	12.6
Total	1459	100.0	541	100.0
Marital status				
Married	1428	97.9	533	98.5
Not married	31	2.1	8	1.5
Total	1459	100.0	541	100.0
Age distribution				
21-30	184	12.6	82	15.2
31-40	387	26.5	194	35.9
41-50	494	33.9	165	30.5
51-60	260	17.8	72	13.3
61-70	134	9.2	28	5.2
Total	1459	100.0	541	100.0

Source: Author's computation

Analysis of the educational attainment of the farmers shows that those without formal education constitute 37 percent, compared with 25 percent with secondary education, 23 percent with primary education and 15 percent with tertiary education (Table 3.2).

Table 3.2—Distribution of respondents by educational attainment

	No formal education		Primary education		Secondary education		Tertiary education	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Gender								
Male	493	66.9	345	74.5	388	77.8	233	77.4
Female	244	33.1	118	25.5	111	22.2	68	22.6
Total	737	100.0	463	100.0	499	100.0	301	100.0
Region								
North	431	58.5	76	16.4	263	52.7	230	76.4
South	306	41.5	387	83.6	236	47.3	71	23.6
Total	737	100.0	463	100.0	499	100.0	301	100.0
Community								
Urban	183	24.8	165	35.6	161	32.3	91	30.2
Semi-urban	336	45.6	209	45.1	161	32.3	94	31.2
Rural	218	29.6	89	19.2	177	35.5	116	38.5
Total	737	100.0	463	100.0	499	100.0	301	100.0
Marital status								
Married	737	100.0	457	98.7	474	95.0	293	97.3
Not married	0	0.0	6	1.3	25	5.0	8	2.7
Total	737	100.0	463	100.0	499	100.0	301	100.0
Age distribution								
21-30	68	9.2	45	9.7	118	23.6	35	11.6
31-40	172	23.3	120	25.9	189	37.9	100	33.2
41-50	247	33.5	159	34.3	146	29.3	107	35.5
51-60	158	21.4	94	20.3	35	7.0	45	14.9
61-70	92	12.5	45	9.7	11	2.2	14	4.6
Total	737	100.0	463	100.0	499	100.0	301	100.0

Source: Author's computation

A majority of farmers in the sample (74 percent) engage in other income-generating activities to make ends meet. About 35 percent engage in petty trading, 17 percent in artisan jobs, 13 percent in the public service, and 9 percent in the private sector. A majority of those who have no other form of secondary occupation are male farmers who operate in the south and are urban-based. Moreover, they are married, of middle age, and without any formal education (Table 3.3).

Table 3.3—Distribution of respondents by secondary occupation

	Artisan		Public service		Private sector employee		Petty trading		No secondary occupation	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Gender										
Male	306	91.3	207	80.0	161	85.2	409	58.2	376	73.1
Female	29	8.7	52	20.1	28	14.8	294	41.8	138	26.8
Total	335	100.0	259	100.0	189	100.0	703	100.0	514	100.0
Region										
North	132	39.4	217	83.8	117	61.9	441	62.7	93	18.1
South	203	60.6	42	16.2	72	38.1	262	37.3	421	81.9
Total	335	100.0	259	100.0	189	100.0	703	100.0	514	100.0
Community										
Urban	84	25.1	100	38.6	41	21.7	138	19.6	237	46.1
Semi-urban	164	49.0	89	34.4	49	25.9	268	38.1	230	44.7
Rural	87	26.0	70	27.0	99	52.4	297	42.2	47	9.1
Total	335	100.0	259	100.0	189	100.0	703	100.0	514	100.0
Educational status										
No formal education	113	33.7	7	2.7	63	33.3	354	50.4	200	38.9
Primary school	115	34.3	9	3.5	38	20.1	151	21.5	150	29.2
Secondary school	90	26.9	100	38.6	56	29.6	141	20.1	112	21.8
Tertiary education	17	5.1	143	55.2	32	16.9	57	8.1	52	10.1
Total	335	100.0	259	100.0	189	100.00	703	100.0	514	100.0
Marital status										
Married	324	96.7	255	98.5	177	93.6	693	98.6	512	99.6
Not married	11	3.3	4	1.5	12	6.3	10	1.4	2	0.4
Total	335	100.0	259	100.0	189	100.0	703	100.0	514	100.00
Age distribution										
21-30	60	17.9	34	13.1	23	12.2	97	13.8	52	10.1
31-40	90	26.9	96	37.1	58	30.7	219	31.1	118	23.0
41-50	105	31.3	85	32.8	68	36.0	240	34.1	161	31.3
51-60	67	20.0	35	13.5	23	12.2	99	14.1	108	21.0
61-70	13	3.9	6	3.5	17	9.0	48	6.8	75	14.6
Total	335	100.0	259	100.0	189	100.0	703	100.0	514	100.0

Source: Author's computation

The sample inadvertently consists of equal number of GESS participants and nonparticipants. A comparison of the socio-demographic characteristics of the farmers in each group shows a reasonable level of homogeneity. GESS participants and nonparticipants are comparable based on their educational attainment, marital status, secondary occupation, age, and gender distribution. About 31 percent of GESS participating farmers are females compared with the nonparticipants that consist of 23 percent females. In each group, about 98 percent of farmers are married; and in terms of age distribution, each group has the same low proportion (8 percent) of farmers who are over 60 years. About one-third of farmers in each group have no formal education; while the proportion with primary and secondary education in each group is 48 percent (Table 3.4).

Table 3.4—Comparison of the socioeconomic characteristics of Growth Enhancement Support Scheme respondents

	GESS farmers		Non-GESS farmers	
	Farmers	Percent	Farmers	Percent
Gender				
Male	686	68.6	773	77.3
Female	314	31.4	227	22.7
Total	1000	100.0	1000	100.0
Region				
North	500	50.0	500	50.0
South	500	50.0	500	50.0
Total	1000	100.0	1000	100.0
Community				
Urban	300	30.0	300	30.0
Semi-urban	400	40.0	400	40.0
Rural	300	30.0	300	30.0
Total	1000	100.0	1000	100.0
Educational status				
No formal education	376	37.6	361	36.1
Primary school	219	21.9	244	24.4
Secondary school	261	26.1	238	3.8
Tertiary education	144	14.4	157	15.7
Total	1000	100.0	1000	100.0
Secondary occupation				
Artisan	172	17.2	163	16.3
Public service	133	13.3	126	12.6
Private sector	48	4.8	141	14.1
Petty trading	398	39.8	305	30.5
No secondary occupation	249	24.9	265	26.5
Total	1000	100.0	1000	100.0
Marital status				
Married	982	98.2	979	97.9
Not married	18	1.8	21	2.1
Total	1000	100.0	1000	100.0
Age distribution				
21-30	123	12.3	143	14.3
31-40	288	28.8	293	29.3
41-50	335	33.5	324	32.4
51-60	173	17.3	159	15.9
61-70	81	8.1	81	8.1
Total	1000	100.0	1000	100.0

Source: Author's computation

Aside from socioeconomic characteristics, there are other distinguishing factors which are worthy of consideration in the description of the GESS and non-GESS participants — access to extension services, access to credit, and access to remittances. In general, the proportion of farmers with access to extension services, remittances and credit is very low; being 46, 21 and 11 percent, respectively (Table 3.5). As regards extension services and credit, the proportion of farmers with access is slightly higher for GESS participants than the nonparticipants. The situation is different in the case of remittances in which the proportion of GESS nonparticipants with access (12 percent) is higher than the proportion of the participants (9 percent).

Table 3.5—Comparison of farmers' status with access to extension, credit and remittances

	Access to extension		Access to credit		Access to remittances	
	Number of farmers with	Farmers without	Number of farmers with	Farmers without	Number of farmers with	Farmers without
Gender						
Male	695	764	40	501	304	1155
Female	234	307	179	1280	110	431
Region						
North	526	474	94	906	191	809
South	403	597	125	875	223	777
Location						
Urban	204	396	101	499	186	414
Semi-urban	332	468	102	698	175	625
Rural	393	207	16	584	53	547
GESS Status						
Participants	496	504	125	875	173	827
Nonparticipants	433	567	94	906	241	759
All farmers	929	1071	219	1781	414	1586

Source: Author's computation

Despite, the similarities in the socioeconomic and demographic characteristics of the farmers, there are different reasons why many of them did not participate in the GESS. Some of the reasons are personal to the farmers, while others are associated with the way in which the scheme was implemented. The single most important personal reason adduced by 47 percent of the farmers is the lack of adequate income to acquire the inputs (Table 3.6). The other personal reason given by a very low proportion (4 percent) of nonparticipating farmers is that they actually did not need the inputs. Some farmers (31 percent) did not participate due to the remoteness of the input redemption centers, while others (19 percent) could not afford to buy a mobile phone, which is required for subsidy delivery and input redemption under the GESS. The proportion of farmers who cannot afford to buy the subsidized inputs is higher in the north (30 percent) than in the south (16 percent), while the proportion of those who complained about inaccessibility to redemption centers is higher in the south (23 percent) than in the north (8 percent). Although the number of farmers who claimed that they did not need inputs is generally very few, the proportion in the south is double that of the north. However, there is no remarkable variation across geographical locations. As expected, the proportion of farmers who complained of lack of financial resources to acquire the inputs is highest (26 percent) in the rural areas, compared with 13 percent in the urban areas and 8 percent in the semi-urban areas. Nonetheless, the lack of easy access to redemption centers is most challenging in the semi-urban areas. It is also more of a problem in the urban areas than in rural areas.

Table 3.6—Reasons for nonparticipation in the Growth Enhancement Support Scheme

	Farmers	Percent
All Non-GESS farmers		
No money to redeem inputs	466	46.6
Redemption center was too far	307	30.7
Have no phone to use	189	18.9
Have no need for the inputs	38	3.8
Total	1000	100.0
Male		
No money to purchase inputs	361	36.1
Redemption center was too far	241	24.1
Have no phone to use	139	13.9
Have no need for the inputs	32	3.2
Female		
No money to purchase inputs	105	10.5
Redemption center was too far	66	6.6
Have no phone to use	50	5.0
Have no need for the inputs	6	0.6
Total	1000	100.0
North		
No money to redeem inputs	304	30.4
Redemption center was too far	82	8.2
Have no phone to use	102	10.2
Have no need for the inputs	12	1.2
South		
No money to purchase inputs	162	16.2
Redemption center was too far	225	22.5
Have no phone to use	87	8.7
Have no need for the inputs	26	2.6
Total	1000	100.0
Urban		
No money to purchase inputs	131	13.1
Redemption center was too far	126	12.6
Have no phone to use	29	2.9
Have no need for the inputs	14	1.4
Semi-urban		
No money to purchase inputs	75	7.5
Redemption center was too far	159	15.9
Have no phone to use	154	15.4
Have no need for the inputs	12	1.2
Rural		
No money to purchase inputs	260	26.0
Redemption center was too far	22	2.2
Have no phone to use	6	0.6
Have no need for the inputs	12	1.2
Total	1000	100.0

Source: Author's computation.

3.2 PROBIT ANALYSIS OF THE FACTORS INFLUENCING FARMERS' PARTICIPATION IN GESS

The variables included in the probit model, as earlier defined, characterize the social, economic and demographic status of the farmers as well as their farming operations. As shown in Table 3.7, the coefficients of 15 of the explanatory variables are statistically significant, while six are not.

Table 3.7—Probit model of farmers' participation in the Growth Enhancement Support Scheme

Probit regression Log likelihood = -307.445 Dependent variable: Farmers' participation in GESS (dummy)		Number of observations = 668 LR chi2(23) = 305.76 Prob > chi2 = 0.000 Pseudo R2 = 0.332		
Variable	**Variable definition**	**Coefficient**	**Stnd. Error**	**P[|Z|>z]**
age	age of farmer (years)	0.005	0.036	0.902
hhsize	household size	-0.039 ***	0.011	0.000
gender	male head of household (0/1)	-0.501 ***	0.147	0.001
farmexp	farming experience (number of years of farming)	0.001	0.0065	0.906
nonfarminc	nonfarm income (₦)	1.26e-06 ***	2.81e-07	0.000
qtyfert	quantity of fertilizer used by farmer (kg)	0.0001	0.00033	0.696
qtyseed	quantity of seed used by farmer (kg)	-0.00005	0.00016	0.737
hirelabor	number of hired workers	-0.045 ***	0.0147	0.002
farmsize	farm size (ha)	0.089 ***	0.034	0.009
riceyield	rice yield (kg/ha)	2.83e-06	8.04e-06	0.725
laborprod	labor productivity (value of total output per worker) (₦)	0.00002 **	0.00001	0.043
famlaborprod	family labor productivity (value of output per family labor, ₦)	-8.54e-06 ***	3.57e-06	0.017
outputvaha	value of total output per hectare (₦/ha)	-0.00002 ***	5.92e-06	0.000
grossmargin	gross margin per hectare (₦/ha)	0.00004 ***	6.74e-06	0.000
percapincome	gross margin per capita (₦)	-2.85e-06	4.16e-06	0.493
remittance	household receives income remittance from elsewhere	-0.190	0.392	0.628
remittance*hirelabor	interaction of remittance with number of hired workers	0.024	0.021	0.254
remittance*grossmargin	interaction of remittance with gross margin per hectare	4.12e-06	2.64e-06	0.119
remittance*nonfarminc	interaction of remittance with nonfarm income	-6.38e-06	4.39e-06	0.146
remittance*qtyfert	interaction of remittance with quantity of fertilizer used	0.001 ***	0.0005	0.017
remittance*qtyseed	interaction of remittance with quantity of seed used	-0.001	0.0004	0.187
remittance*farmsize	interaction of remittance with farm size	-0.119 *	0.066	0.073
age^2	square of age of farmer (years)	-0.0001	0.00039	0.816
laborprod^2	square of labor productivity	-1.19e-10 ***	4.62e-11	0.010
famlaborprod^2	square of family labor productivity	1.19e-11 ***	4.74e-12	0.012
outputvaha^2	square of value of total output per hectare	5.27e-11 ***	1.20e-11	0.000
grossmargin^2	square of gross margin per hectare	-1.05e-10 ***	1.86e-11	0.000
percapincome^2	square of gross margin per capita	1.53e-11	1.06e-11	0.149
constant	constant	0.333	0.832	0.688

Source: Authors' computation.

Note: ***significant at 1% level; **significant at 5% level; *significant at 10% level.

The results show that farmers' participation in GESS depends significantly on labor productivity, output value per hectare, gross margin per hectare, and their higher order terms, as well as on household size, gender, non-farm income, farm size, hired labor, and remittances (interaction terms with fertilizer and farm size). The non-significant variables are age, farm income per capita, and their higher order terms, as well as farming experience, fertilizer, seed, and rice yield. The probability of participating in the GESS is positively correlated with labor productivity, gross margin per hectare, non-farm income, farm size, and remittances-fertilizer interaction term; whereas, it is negatively correlated with household size, gender, hired labor, and value of output per hectare. There is a higher probability that farmers with high labor productivity, gross margin per hectare, and non-farm income will participate in the GESS. Female farmers are more likely to participate than their male counterparts. There is also a higher probability that farmers with relatively larger farm size will participate. However, the probability is lower for farmers with a large household size and for those using higher levels of hired labor and for those having a higher value of output per hectare.

With the exception of farm size, household size, and hired labor, the marginal effects of the individual variables are found to be very low (Table 3.8). An additional hectare of cultivated land will increase the probability of GESS participation by 3.2 percentage points. On the other hand an additional member in the household may reduce the GESS participation probability by 1.4 percentage points, while a reduction of 1.6 percentage points is likely in the event that an additional worker is hired by the farmer.

Table 3.8—Marginal effects of variables in probit model of farmers' participation in the Growth Enhancement Support Scheme

Variable	Coefficient	Standard Error	P[|Z|>z]
age	0.002	0.013	0.902
hhsize	-0.014 ***	0.004	0.000
farmexp	0.0003	0.002	0.906
nonfarminc	4.52e-07 ***	0.000	0.000
qtyfert	0.00005	0.000	0.695
qtyseed	-0.00002	0.000	0.737
hirelabor	-0.016 ***	0.005	0.002
farmsize	0.032 ***	0.012	0.009
riceyield	1.02e-06	0.000	0.725
laborprod	8.74e-06 **	0.000	0.046
famlaborprod	-3.07e-06 ***	0.000	0.018
outputvaha	-9.55e-06 ***	0.000	0.000
grossmargin	0.00002 ***	0.000	0.000
percapincome	-1.02e-06	0.000	0.492
remittance*hirelabor	0.009	0.008	0.253
remittance*grossmargin	1.48e-06	0.000	0.118
remittance*nonfarminc	-2.29e-06	0.000	0.148
remittance*qtyfert	0.0005 ***	0.000	0.018
remittance*qtyseed	-0.0002	0.000	0.182
remittance*farmsize	-0.042 *	0.023	0.075
age^2	-0.00003	0.000	0.816
laborprod^2	-4.27e-11 ***	0.000	0.012
famlaborprod^2	4.27e-12 ***	0.000	0.013
outputvaha^2	1.74e-11 ***	0.000	0.000
grossmargin^2	-3.76e11 ***	0.000	0.000
percapincome^2	5.48e-12	0.000	0.150

Source: Authors' computation.

Note: ***significant at 1% level; **significant at 5% level.

3.2.1 USE OF INPUTS BY FARMERS UNDER THE GROWTH ENHANCEMENT SUPPORT SCHEME

The subsidized inputs obtained by farmers under the GESS are supposed to be used directly for production purposes during the season in which the inputs are delivered. However, socio-cultural factors in the various communities may make absolute compliance with this expectation impossible. Some farmers may sell part or all the inputs to nonparticipating farmers who are in need of the inputs, but cannot afford to buy at the prevailing market price. It is also possible that participants who are in dire need of cash sell the inputs right at the redemption centers and use the money for consumption purposes or to hire labor to undertake critical farming operations, such as land clearing and weeding. As shown in Table 3.9, these phenomena are not common. The practices are limited to urban and semi-urban areas. In rural areas, farmers fully apply all the subsidized inputs on their farms.

Table 3.9—Utilization of subsidized inputs by Growth Enhancement Support Scheme farmers

	Farmers	Percent
All GESS farmers		
Application to farms	967	96.7
Sale of part of the inputs	26	2.6
Give part of inputs to friends	7	0.7
Total	1000	100.0
Male		
Application to farms	669	66.9
Sale of part of the inputs	11	1.1
Give part of inputs to friends	6	0.6
Female		
Application to farms	298	29.8
Sale of part of the inputs	15	1.5
Give part of inputs to friends	1	0.1
Total	1000	100.0
North		
Application to farms	493	49.3
Sale of part of the inputs	3	0.3
Give part of inputs to friends	4	0.4
South		
Application to farms	474	47.4
Sale of part of the inputs	23	2.3
Give part of inputs to friends	3	0.3
Total	1000	100.0
Urban		
Application to farms	272	27.2
Sale of part of the inputs	25	2.5
Give part of inputs to friends	3	0.3
Semi-urban		
Application to farms	395	39.5
Sale of part of the inputs	1	0.1
Give part of inputs to friends	4	0.4
Rural		
Application to farms	300	30.0
Sale of part of the inputs	0	-
Give part of inputs to friends	0	-
Total	1000	100.0

The trigger for exchange of inputs for cash may not always be poverty-related, but may arise in some cases as a result of late arrival of the inputs. Where the inputs cannot be easily sold, some farmers often decide to redeem inputs less than the allotted quota of two bags of fertilizers and 20kg of seeds. As shown in Table 3.10 only 5 percent of beneficiary farmers engaged in this practice during the 2013 production season. Partial redemption of inputs is more common among male farmers compared with females and is more predominant in the south than in the north. However, it is not a rural phenomenon, but limited to urban and semi-urban areas.

Table 3.10—Distribution of farmers involved in partial redemption of inputs by gender and region, count

	Full redemption	Partial redemption
All GESS farmers	954	46
Male	658	28
Female	296	18
North	496	4
South	458	42
Urban	267	33
Semi-urban	387	13
Rural	300	0

Source: Author's computation

It is important to stress that the supply of subsidized inputs under the GESS has been an impetus for increased used of modern inputs among small-scale farmers. Many farmers are now in the practice of purchasing more fertilizer and seed from the open market when they realize that they need more than the fixed quantity supplied under the GESS.

4. SUMMARY, POLICY RECOMMENDATIONS AND CONCLUSIONS

The Growth Enhancement Support Scheme which commenced in 2012 is the flagship component of the Agricultural Transformation Agenda (ATA). It has witnessed considerable policy changes in the procurement and distribution of agricultural inputs and in the delivery of input subsidy to the small-scale farmers. Despite the applause elicited by the policy reform and the innovative technology applications in the delivery of subsidized inputs to farmers under the GESS, its performance remains unsubstantiated. This study has blazed the trail in this regard. It examines the performance of GESS implementation and determines the factors influencing farmers' participation. This section highlights the main findings, provides suggestions for improved performance and sustainability of the scheme and rounds off with conclusions.

4.1 Main findings

The analysis of the implementation performance of the GESS shows that the delivery of subsidy is technology driven. There are technology applications in registering farmers, redeeming subsidized inputs, supply chain management and paying input suppliers. The performance is assessed using indicators such as subsidy inclusion rate, input redemption rate, and participation rate. There is wide variation in these performance indicators across the geopolitical zones, but they are generally skewed in favor of the agriculture-dependent zonal economies. For instance, on an annual basis, the share of registered farmers is higher in the north (69, 67 and 69 percent in 2012, 2013, and 2014, respectively) than in the south (32, 33, and 32 percent, respectively). The desired participation rate (subsidy inclusion rate) and effective participation rate have been rising in each of the geopolitical zones from 2012 to 2014. However, the distribution has been skewed in favor of the northern zones, which are known to be agriculture-dependent. Despite increases in the inclusion rates in 2013 and 2014, the percentage of redeemed farmers was much lower in the southern zones than the northern zones. Contrary to expectation, a more even distribution of the inclusion rates among the geopolitical zones in 2013 and 2014 has not been associated with high participation rates in the southern geopolitical zones, especially in 2013. Moreover, the divergence between the desired rate of participation and effective rate of participation continues to widen in 2013 and 2014 compared with the situation in 2012. This is an indication of the difficulty in maintaining the redemption rate at a high level over the period.

Nonetheless, there is evidence that significant improvement in the compliance with input allocation criteria and better access to inputs by farmers has been achieved due to better targeting of farmers, improved management of supply chain and monitoring of input distribution right from 2013. For two consecutive years, 2013 and 2014, it has been possible to sustain full compliance with the stipulated quantity of fertilizer accessible to a farmer. The number of farmers targeted for the subsidy benefit continued to increase from 1.09 million in 2012 to 7.24 million in 2013 and 8.30 million in 2014. The redemption rate decreased from 67 percent in 2012 to 57 percent in 2013, but increased to an all-time high of 87 percent in 2014; while the effective participation rate has been growing at an increasing rate over the period.

The quantity of fertilizer distributed to farmers increased from 120,903 metric tonnes in 2012 to 466,638 metric tonnes in 2013 and rose phenomenally to 748,834 metric tonnes in 2014. On fertilizer subsidy alone, the amount spent by the federal government rose from 6.65 billion naira in 2012 to 22.92 billion naira in 2013 to 41.19 billion naira in 2014. This implies that the total public spending on fertilizer subsidy by federal and state governments over the period increased from 13.30 billion naira in 2012 to 45.84 billion naira in 2013 to 82.38 billion naira in 2014. The number of farmers that benefited from the subsidy increased from 728,936 in 2012 to 4.12 million in 2013 to 7.22 million in 2014.

4.2 Policy recommendations

The achievements and contributions of the Growth Enhancement Support Scheme so far recommend it for continued operation. However, the implementation has to be strengthened and source of financing diversified to guarantee its sustainability. This is imperative in view of the sharp decline in the nation's revenue on account of the recent fall in crude oil price globally. Other suggestions which have also been made in a recent study (Olomola 2014a) are germane and are reiterated here with details of specific measures to be taken to ensure greater transparency in GESS implementation, to reduce costs of operation, to strengthen regulatory and monitoring activities, to depoliticize farmers' registration, and to reduce the fiscal burden of input subsidy.

4.2.1 ENSURE GREATER TRANSPARENCY IN GROWTH ENHANCEMENT SUPPORT SCHEME IMPLEMENTATION

Overhaul the payment system under the GESS: The government should introduce an automated payment system at the input Redemption Centers to minimize oligopsony abuses – that is, to prevent agrodealers from colluding to charge arbitrary fees. Specifically, it is recommended that government should make mandatory the use of point of sales (POS) machines for input redemption. These POS machines should be in the custody of the supply chain manager and be operated by the helpline staff. The machines should be coded such that it has time frame during which it can operate – say 8 am to 5 pm. The issue of some agrodealers attempting to redeem as early as 7 am to abuse the redemption process will not arise.

Better record keeping: The officials involved in monitoring the agrodealers at the RCs should ensure that the agrodealers always issue receipts for the inputs purchased by the farmers and keep accurate records in order to minimize discrepancies during reconciliation of records with supply chain managers and Cellulant.

Ensure greater transparency and competitiveness in agrodealers' selection: The government should follow a competitive bidding process for the recruitment of agrodealers in all states. The Procurement Department of FMARD should use relevant, achievable, and agro-industry-sensitive criteria; rather than prototypes that are used in other unrelated sectors, such as oil and gas.

Disallow multiple redemption: The practice whereby a farmer often collects inputs on behalf of other farmers – sometimes as many as ten – should be discouraged. This is because the absentee farmers cannot be verified, and, in some cases, they may not even exist at all.

Improve farmers' identification process: The rule of Cellulant that if a farmer without a phone comes to collect input, the village head or a well-known community leader should stand for such a farmer should be abolished. This is because not all farmers in a community are known to the leader. Due to personal relationships between agrodealers and some leaders, the agrodealers use this opportunity to manipulate farmers; in the sense that the farmers will not even be aware agrodealers will just insert the phone numbers of the community leaders and redeem as many farmers as possible.

Agrodealers benefit from this practice in three ways. (i) For every two bags of fertilizer redeemed, they are entitled to ₦700 commission paid by the supplier. (ii) They use the practice to harbor inputs by requesting for more inputs from suppliers whereas the inputs that pass through the process of "ghost redemption" are still physically available in the agrodealers' store. Since the inputs have been regarded as redeemed, they will remit the farmers' "|cash payment" of ₦5,500 (for two bags of fertilizer) into the account of the suppliers but later sell off the inputs at the market price of ₦5,500 per bag. (iii) If the agrodealers do not even want to wait to sell at market price, they can re-redeem the inputs later to genuine farmers following the actual redemption process and so obtain commission of ₦700 on two bags again (double commission).

4.2.2 STRENGTHEN REGULATORY AND MONITORING ACTIVITIES

Intensify regulatory role of government. There should be more effective regulatory activity by the National Agricultural Seed Council (NASC) and Federal Fertilizer Department to improve the quality of inputs being supplied to farmers. Government through the NASC should monitor the seed suppliers to ensure that seeds supplied to agrodealers and distributed to farmers meet specified standards. Appropriate sanctions should be meted out to suppliers and agrodealers that adulterate seeds and producers that produce sub-standard seed varieties.

Provide facilities for effective monitoring of GESS implementation: Emphasis should be placed on effective monitoring. In this regard, vehicles should be purchased and dedicated for the activity accordingly. Each tier of government should ensure availability of transportation facilities for monitoring all activities associated with GESS.

De-bureaucratize the GESS roll-out process to avoid delays in input supply to farmers: To ensure adequate preparation on the part of Cellulant, all activities necessary to be completed before the roll out date should be accorded high priority by the GESS implementation committee at the state level and other stakeholders such as the supply chain managers. The roll out date should be set after the conclusion of mapping and submission of all necessary information to Cellulant.

4.2.3 REDUCE OPERATIONAL COST TO ENHANCE IMPLEMENTATION PERFORMANCE

Reduce GESS operational cost; especially by making supply chain management more cost effective: This can be achieved by involving the virtually redundant extension staff rather than hiring casual staff for redemption purposes. The senior staff in the Planning, Monitoring and Evaluation Departments of the Agricultural Development Programs (ADPs) can be trained by the training experts from the supply chain managers and deployed as zonal supervisors during the redemption exercise. With this approach, the number of such supervisors can be increased so that they can effectively cope with the required supervision in the growing number of redemption centers in many states. For effective supervision, a zonal supervisor should not be allowed to supervise more than 15 RCs. The extension workers in the ADPs can also be trained in GESS redemption activities to enable them to participate as helpline staff (redemption center supervisors) during the few weeks earmarked for the redemption exercise, rather than spending huge sums of money to employ personnel that are incapable of handling the situation at the centers. Of course where the extension workers are in short supply, additional capable hands could be recruited.

Depoliticize and reduce the cost of the farmers' registration exercise: The cost of farmers' registration is becoming increasingly unbearable for both the federal and state governments. Besides, the genuineness of many of the farmers registered is questionable in many states. To depoliticize the exercise and reduce cost, two measures are recommended.

1. Routinize the process and make it less expensive and less politicized. In this regard farmers' registration should be made an ongoing annual exercise at the local government level. Desk officers should be designated for the exercise in each LGA and the responsibilities of such officers as well as targets should be clearly defined and facilities provided for their accomplishment. By so doing the episodic funding and political sensitization often associated with the exercise and the inherent inaccuracies and manipulations can be avoided and rendered completely unnecessary.
2. Involve farmers' associations in the identification and registration process. These should include state chapters of All Farmers Association of Nigeria and commodity associations at the state and LGA levels.

4.2.4 REDUCE THE BURDEN OF SUBSIDY

Government should work out a strategy to refocus its input subsidy spending: This is to shift emphasis in the medium term from subsidizing private goods to subsidizing agriculture-related public goods such as extension, research, and irrigation facilities.

Bring in new generation of young people into the agricultural business: This will lower demand for financing in terms of subsidy payments and shift the emphasis into equity and debt financing with increased participation by the banking sector.

States should avoid parallel fertilizer subsidy programmes: The funds saved in this process should be used to admit more farmers into the GESS.

4.2.5 DIVERSIFY SOURCE OF GROWTH ENHANCEMENT SUPPORT SCHEME FINANCING

Government should promote trade credit in agrodealer financing to accommodate both medium and large-scale entrepreneurs. In this regard, large-scale agrodealers can be financed by the banks. They can, in turn, provide trade credit to medium-scale agrodealers, who in turn can supply inputs on credit to small-scale dealers. By supporting medium-scale agrodealerships, it should be possible to have a more reasonably distributed market share in the agrodealer sector and so reduce transportation cost, supply shortages, and delays in farm operations (Olomola 2014b).

4.2.6 IMPROVE REDEMPTION RATE

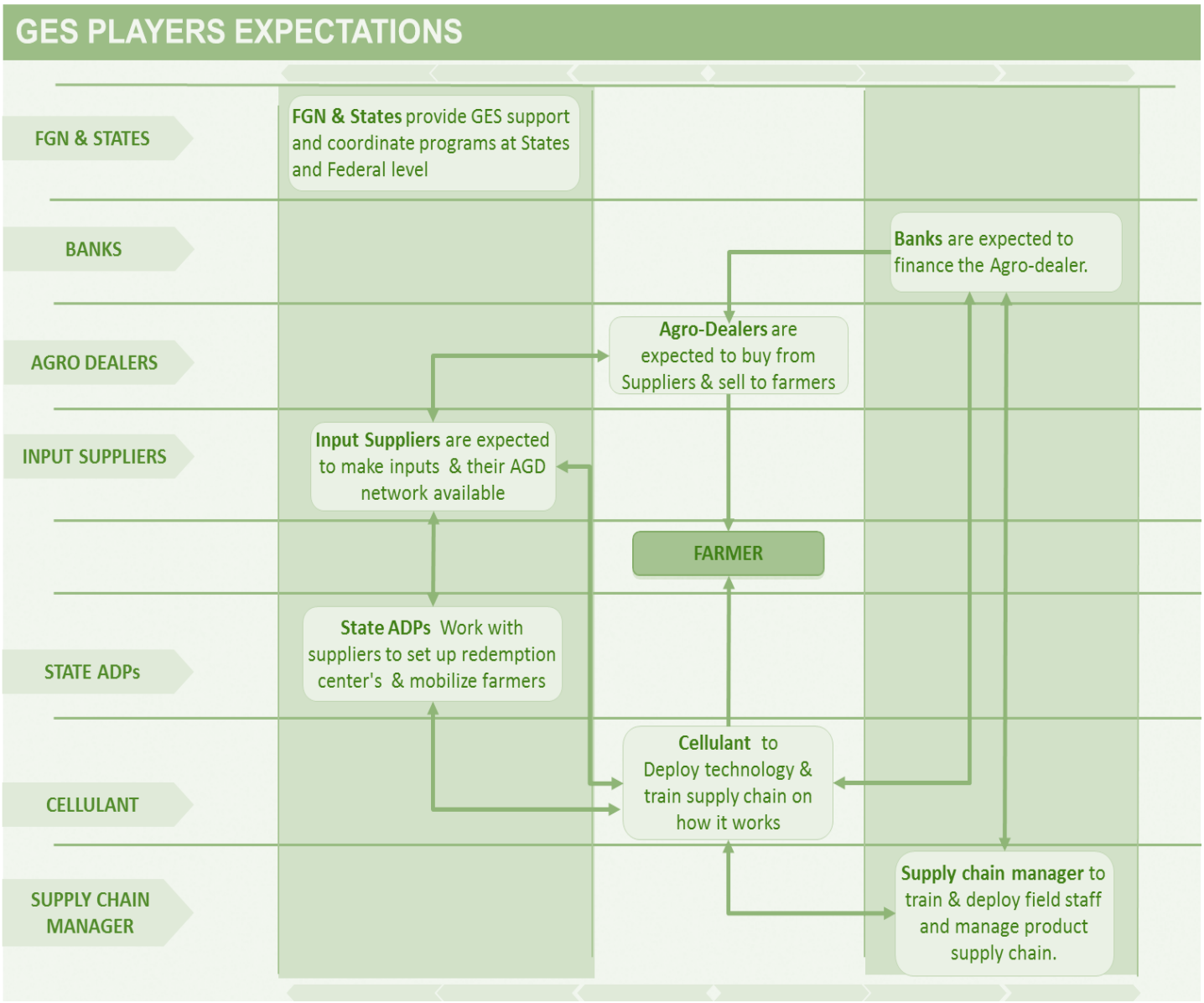
Despite the increase in the number of farmers being targeted annually for participation in the GESS, the redemption rate continues to fall below expectation. To improve the situation, there should be effective communication between GESS administrators and the potential beneficiaries. State governments should take on the responsibility of disseminating the information about the commencement of the redemption exercise and the location of redemption centers to the farmers in the various LGAs. Information could be disseminated through town criers and radio jingles in local dialects. Cellulant should ensure that the procedures and rules guiding the roll out of the input redemption should be transmitted to all stakeholders well ahead of time. The supply chain managers, helpline staff, state GESS committees, agrodealers, and farmers need to be fully aware of their responsibilities to minimize hitches. The required information in this regard should be promptly made available by Cellulant. Moreover, the redemption codes should be broadened to accommodate farmers who have preference for various combinations of fertilizer including those who want to purchase two bags of urea or two bags of NPK. Besides, Cellulant should reorganize the workload of its technical staff to avoid delays in transmitting responses to redemption messages and resolving issues sent to it to be resolved during the redemption exercise. A decentralization of the Cellulant platform to the state level is highly recommended in order to reduce errors and to ensure that technical problems are promptly resolved during the redemption exercise.

4.3 Conclusions

The study found that the success achieved under the GESS depended upon the introduction of supply chain management and the application of innovative technology exemplified by the electronic-wallet system of subsidy delivery. Despite increases in the rate at which farmers were being included in the GESS scheme in 2013 and 2014, it has been difficult to close the widening gap between the desired and effective participation rates due to the fact that the redemption rate continued to fall below expectation. This implies that in spite of the level of success achieved, challenges remain, but they are by no means insurmountable. Indeed, with better targeting of farmers, improved management of supply chains, and monitoring of input distribution right from 2013, it has been possible to achieve significant improvement in the compliance with input allocation criteria and better access to inputs by farmers.

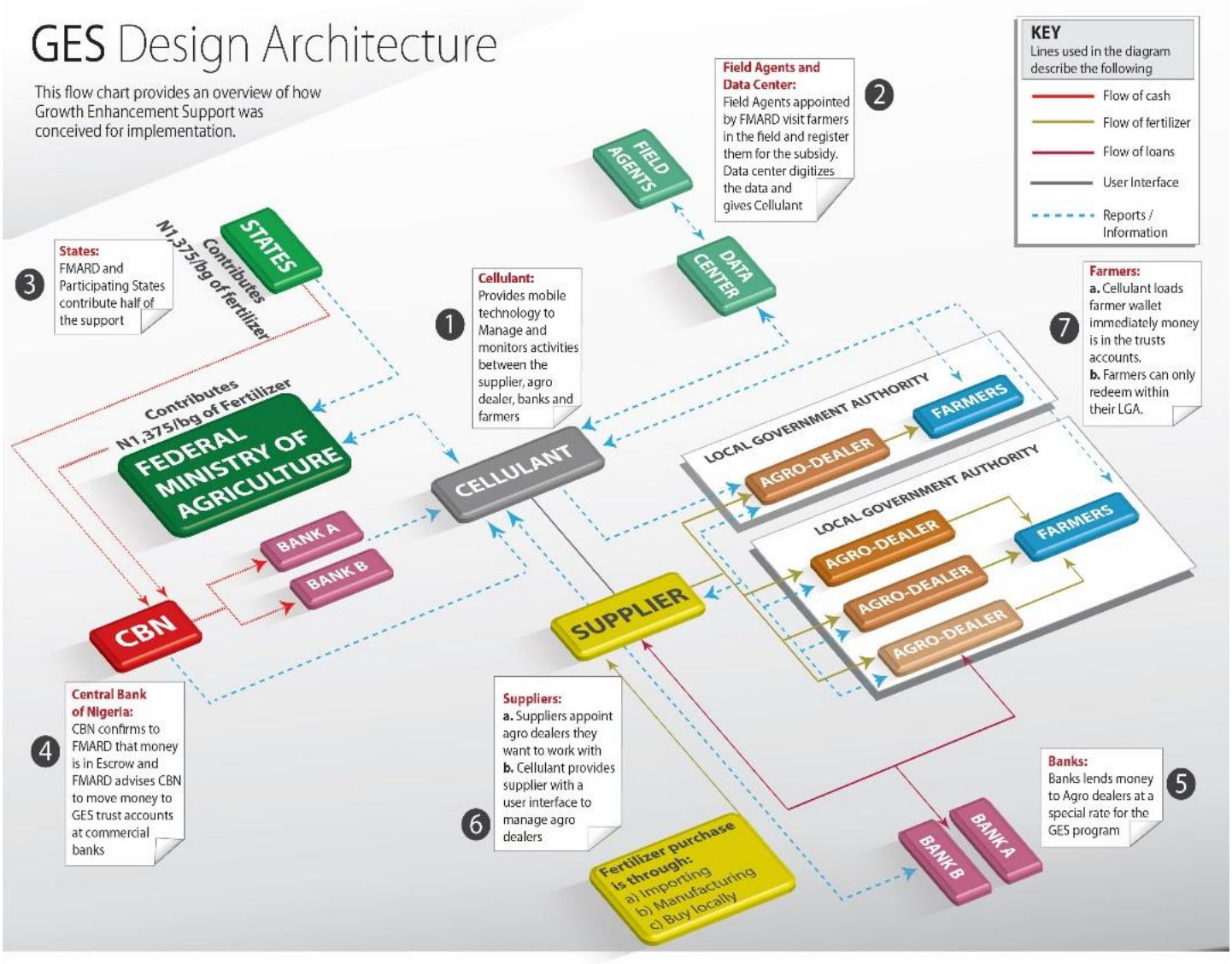
APPENDICES

Appendix 1: Framework of Growth Enhancement Support Scheme inter-agency relationships



Source: Cellulant, Abuja.

Appendix 2: Growth Enhancement Support Scheme design architecture



Source: Cellulant, Abuja

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