This World Bank Development Marketplace funded project, which relies on linked but simple innovations, has significant potential to be expanded in Ogun State and replicated in other cassava producing states in Nigeria. The two year Development Marketplace project has demonstrated the capacity of these simple innovations to raise substantially the incomes of goat keepers and cassava growers, many of whom are women. There is unmet demand for expansion in Ogun State. The University of Agriculture in Abeokuta has created a model that can be adjusted to institutions and contexts in other states. Scaling up in this fashion can help Nigeria meet its poverty reduction and improved livelihood goals at the same time as it reduces the impact of burning cassava waste on the environment.

For the
Agriculture and Rural Development Department,
The World Bank

September 2011
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EXECUTIVE SUMMARY

Case Study:
Adding Value to Waste in the Cassava Processing-Goat Keeping Systems in Nigeria

September 2011

Prepared by: Danielle Fuller, The Heller School for Social Policy and Management, Brandeis University

World Bank Development Marketplace Project Number 4345
Implementing Organization: University of Agriculture, Abeokuta, Nigeria (UNAAB)
Support from the World Bank Agriculture and Rural Development Department

This project, which relies on linked but simple innovations, has significant potential to be expanded in Ogun State and replicated in other cassava producing states in Nigeria. The two year Development Marketplace project has demonstrated the capacity of these simple innovations to raise substantially the incomes of goat keepers and cassava growers, many of whom are women. There is unmet demand for expansion in Ogun State. The University of Agriculture in Abeokuta has created a model that can be adjusted to institutions and contexts in other states. Scaling up in this fashion can help Nigeria meet its poverty reduction and improved livelihood goals at the same time as it reduces the impact of burning cassava waste on the environment.

Nigeria is the largest producer of cassava in the world with an annual production of over 40 million metric tons (MT). Up until now, the cassava waste, comprised of the peel and chaff, has been discarded and either burned, releasing toxic fumes, or left to rot.

The Nigeria project, Adding Value to Waste in the Cassava Processing-Goat Keeping Systems in Nigeria, is comprised of five innovations: a simple technology (a drying platform for the cassava peels to be used instead of burning the waste), a new product (clean dried cassava peels that can be sold as goat feed), an educational component (a diet prescribed to goat farmers, designed by animal scientists that utilizes cassava peels and maximizes the growth rate and health of the goats), access to credit (facilitating micro-credit loans to build the drying platforms), and a new market mechanism (linking cassava processors and goat keepers).
The innovation provides a measureable economic benefit to both cassava processors and goat farmers with average annual incomes less than $2 a day. Original estimates suggest an annual increase of $384 USD and $198 USD respectively and early evidence indicates gains closer to $635 USD a year (DM TEAM, October 1, 2010). Further, recycling the cassava waste into a marketable product provides an environmental benefit by preventing the burning of cassava waste and the subsequent release of harmful toxins into the air.

The project aligns with the goals of the Federal Government of Nigeria, the World Bank, and the Millennium Development Goals. It benefits from strong leadership and offers economic and environmental benefits but lacks a champion to advocate for the innovation and help bring it to scale. The World Bank Country Office will play an important role in garnering the support of the Federal Government of Nigeria to assist in bringing the innovation to scale.

Based on the success of the pilot phase, we recommend that the innovation be brought to scale and offer three recommendations for the scaling process: 1.) Re-introduce a micro-credit component to ensure that the poorest of the poor have access to credit and can therefore, take advantage of the innovation; 2.) increase the benefits of the project by strengthening the market mechanism; and 3.) partner with FADAMA III and adopt the community-centered model.
Case Study:
Adding Value to Waste in the Cassava Processing-Goat Keeping Systems in Nigeria

Introduction

Nigeria is the largest producer of cassava in the world with an annual production of over 40 million metric tons (MT). More than 90% is processed and consumed locally. Up until now, the cassava waste, comprised of the peel and chaff, has been discarded and either burned, releasing toxic fumes, or left to rot.

The use of cassava as livestock feed is limited in Nigeria and Africa in general, in contrast to other regions of the world where cassava is grown. In Africa, where 87 million tons of cassava is processed annually, only 6% is used as livestock feed. In comparison, 32% of the cassava produced in Latin America is used for livestock feed and in Asia, the number is over 40% (International Fund for Agricultural Development (IFAD) and Food and Agriculture Organization of the United Nations, 2000).

The Nigeria project, Adding Value to Waste in the Cassava Processing-Goat Keeping Systems in Nigeria, capitalizes on the large cassava industry in Nigeria and the opportunity to convert the waste into a marketable product for goat feed. After receiving Development Marketplace (DM) funding for two-years from the Agriculture and Rural Development department of the World Bank, the project was selected for a case study based on an initial assessment of the 22 DM/ARD projects to ascertain if the project is able to be brought to scale and to provide a basis for the next stage of the scaling up process. The initial review found the project to be a strong candidate for scaling based on a number of criteria identified in the literature review.

The project provides evidence of indigenous organizational and leadership capacity to scale up a simple innovation to reach an increasing number of rural communities within Nigeria and potentially beyond. The University of Agriculture in Abeokuta, the current implementing agency, has the technical and organizational capacity and the commitment to scale up in Ogun State and could play a role in fostering replication in other states in Nigeria.

The innovation provides a measureable economic benefit to both cassava processors and goat farmers with average annual incomes less than $2 a day. Original estimates suggested an annual increase of $384 USD and $198 USD respectively ("Development Marketplace Proposal #4345," 2008, p. 2) and early evidence indicates gains closer to $635 USD a year (DM TEAM, October 1, 2010). Further, recycling the cassava waste into a marketable product provides an environmental benefit by preventing the burning of cassava waste and the subsequent release of harmful toxins into the air.
Early evidence of the innovations’ benefits has led to a growing demand for participation. Already in its first two years, the project exceeded the initial target of reaching 3,600 cassava processors and 600 goat keepers, expanding its reach to 21 additional locations and directly benefiting 6,078 processors and 886 goat keepers. The expansion was a direct result of pressure from agricultural extension officers and the communities they represent ("Personal interview with Dr. Kolawole Adebayo, Project Team Leader," March 4 and August 7, 2011). Project team leaders estimate that there is potential to reach 200,000 of the 350,000 farmers in the state of Ogun in addition to thousands more in the remaining states ("Development Marketplace Proposal #4345," 2008, p. 2).

The country context for expansion within Nigeria offers organizational capacity, government interest in enhancing the cassava industry, available resources, and a relatively well-educated population. Given the use of cassava as a plant that thrives under drought conditions, this innovation may have a broader application across West Africa and elsewhere, allowing Nigeria the opportunity to play a role in dissemination and replication.

**Country Assessment**

Located in West Africa between Benin and Cameroon and bordering the Gulf of Guinea, Nigeria is Africa’s most populous country, with a population of over 155 million people in an area that is slightly larger than twice the size of California. The country is a federal republic comprised of 36 states and the Federal Capital Territory, Abuja.

Nigeria is a lower middle-income country with an economy dominated by oil. With over 36 billion barrels of oil, Nigeria has the tenth largest reserve of oil in the world ("Country Profile: Nigeria," July 2008), accounting for 85% of government revenue (The World Bank, 2009). However, corruption has prevented the oil wealth from improving the lives of average Nigerians. According to a World Bank estimate, 80 percent of energy revenues benefit only one percent of the population ("Country Profile: Nigeria," July 2008). International organizations have pressured recent administrations to diversify the economy in order to prevent dependence on oil and to create a more robust economy.

Nigeria is among the countries with the highest levels of inequality in the world. Despite the abundant oil revenue, much of the country still lives in poverty. Gross Domestic Product (GDP) per capita, adjusted for purchasing power parity in the U.S. is $2,289. The multidimensional poverty index (MPI) provides a more accurate picture of poverty than just income by looking at 10 health, education and standard of living indicators. Nigeria has an MPI of .368, calculated by multiplying the incidence of poverty by the average intensity across the poor. Another way to understand the level of poverty in Nigeria is to look at the percentage of people that are poor: 64% of the population are defined as “very poor,” using both the MPI criteria and the World Bank definition of those living on $1.25 a day or less; 84% of the population are considered “poor,” living on less than $2 a day (Alkire & Maria Emma Santos, 2010).
The disparity within the country is also represented in educational attainment. While the country boasts a number of excellent Universities and many well-educated professionals, the mean education of adults is comprised of only five years of schooling. Poor health care and an HIV/AIDS prevalence of 3.9 percent contribute to an average life expectancy of only 48 years. Unemployment is of growing concern, with a rate over 23% in rural areas and more than 12% in urban areas.

Table 1: Nigeria Economic and Human Development Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita, PPP (2008 PPP USD)</td>
<td>$2,289.0</td>
</tr>
<tr>
<td>Education (Mean years of schooling, of adults)</td>
<td>5.0</td>
</tr>
<tr>
<td>Life expectancy at birth (years)</td>
<td>48.4</td>
</tr>
<tr>
<td>Rural Unemployment*</td>
<td>23.2%</td>
</tr>
<tr>
<td>Urban Unemployment*</td>
<td>12.4%</td>
</tr>
<tr>
<td>Poverty (Multidimensional poverty index, k greater than or equal to 3)¹</td>
<td>0.368</td>
</tr>
<tr>
<td>Percentage of MPI Poor*</td>
<td>64%</td>
</tr>
<tr>
<td>Percentage of Income Poor ($1.25 a day)*</td>
<td>64%</td>
</tr>
<tr>
<td>Percentage of Income Poor ($2.00 a day)*</td>
<td>84%</td>
</tr>
<tr>
<td>Percentage of Poor (National Poverty Line)*</td>
<td>34%</td>
</tr>
<tr>
<td>Human Development Index Rank (out of 165 countries)²</td>
<td>142</td>
</tr>
</tbody>
</table>

Data Source: (UNDP, 2010)

*Data Sources: ((International Monetary Fund, 2007)

**Data Source: (Alkire & Maria Emma Santos, 2010)

Agriculture

Sixty percent of Nigerians work in agriculture and over 86 percent of the land in Nigeria is used for agricultural purposes. The country produces a number of agricultural products

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¹ Composite measure of the percentage of deprivations that the average person would experience if the deprivations of poor households were shared equally across the population.

² A composite index out of 169 countries measuring average achievement in three basic dimensions of human development—a long and healthy life, knowledge and a decent standard of living.
including cocoa, peanuts, cotton, palm oil, corn, rice, sorghum, millet, cassava, yams, rubber and timber. Cattle, sheep, goats, pigs, and fish are also raised for sale (CIA, 2011). In addition to agriculture, the country is rich with natural resources including petroleum, tin, iron ore, coal, limestone, lead, zinc and significant natural gas reserves, comprising the largest reserve in Africa and the seventh largest in the world ("Country Profile: Nigeria," July 2008).

The climate varies throughout the country: equatorial in the south, tropical in the center and arid in the north. For this reason, the 24 central and southern states are the regions where cassava is grown. While the central region boasts lush rainforest, the country as a whole suffers from a number of environmental issues including soil degradation, rapid deforestation, desertification, oil pollution, and loss of arable land (CIA, 2011). Rapid urbanization and industrialization have created a widespread waste management problem from the open burning and dumping of waste and improperly constructed landfills which have resulted in air, water and soil pollution ("Country Profile: Nigeria," July 2008). Deforestation, a result of logging, burning and overgrazing by livestock has led to a loss of almost half of the forests since 1990. The project being assessed addresses the issue of waste management, open burning, and deforestation due to livestock grazing.

**Government Development Priorities**

A former British colony, Nigeria gained its independence in 1960. Between 1960 and 1999, Nigeria experienced a number of military regimes and a brutal civil war. With the election of President Yar Adua in 1999 after almost 16 years of military rule, the country transitioned to a civilian government.

In 2000, Nigeria signed an agreement with the International Monetary Fund (IMF) that allowed debt restructuring, contingent on economic reforms. Between 2003 and 2007, Nigeria implemented the National Economic Empowerment Development Strategy (NEEDS), an economic reform program designed to raise the country’s standard of living. NEEDS was designed to address basic deficiencies, including lack of freshwater for household use and irrigation, unreliable power supplies, failing infrastructure, and corruption and also set the budget based on conservative estimates of oil revenue, providing stability against the fluctuations in oil prices. ("Country Profile: Nigeria," July 2008). The economy responded with strong growth between 2003 and 2007.

The Poverty Reduction Strategy Paper (PRSP) for Nigeria, prepared in consultation with the staffs of the World Bank and the IMF, evaluated NEEDS and SEEDS (the state level economic empowerment and development strategy) and found the overall performance of NEEDS to be remarkable. Advances in the agriculture sector during this time include:

- An average annual agriculture growth rate of 7.0% from 2004 – 2006 (target goal was 6%).
A 36% increase in the production of cassava, from 36 metric tons in 2005 to 49 metric tons in 2006 (International Monetary Fund, 2007).

While NEEDS surpassed many expectations, it did not achieve the poverty reduction, employment generation and power supply goals (International Monetary Fund, 2007).

In 2008 Nigeria began to implement market-oriented reforms such as modernizing the banking system, curbing inflation and addressing disputes over the distribution of oil earnings (CIA, 2011). Former President Umaru Musa Yar’adua, after taking office in 2007, implemented a policy known as Vision 2020, designed to transform Nigeria into one of the world’s top-20 economies by 2020. Vision 2020 is focused on power and energy infrastructure, food security and agriculture, wealth creation and employment, mass transportation, land reform, security, and education ("Country Profile: Nigeria," July 2008). The current President, Goodluck Jonathan, has pledged to continue economic reform with a focus on infrastructure improvements that include privatization of the state-run electricity generation and distribution facilities and strengthening public-private partnerships for roads.

A longer-term economic development program is the UN National Millennium Development Goals (MDG’s) for Nigeria. Implemented in 2000 and planned through 2015, the objective is to reduce poverty, increase access to education, achieve gender equality, improve health, protect the environment and promote international development cooperation. The MDGs are part of a global agenda but also align with Nigeria’s own development vision, as outlined in the 1999 constitution ("Nigeria Millennium Development Goals Report," 2010).

Boosted by the country’s debt relief in 2005, which added one billion dollars to the annual budget, the government of Nigeria is using the infusion of funds to invest in pro-poor programs needed to achieve the MDGs. The Vision 2020 policy serves as the framework for the investments needed to meet the development goals. The latest MDG report for Nigeria, published in 2010 by the Government of Nigeria, indicates progress towards achieving the stated goals. Between 2005 and 2009, primary health care services have been extended to over 20 million people, safe water has been provided to over 8 million people, insecticide-treated nets have been distributed to 5 million mothers and children to protect them against malaria and there has been a 98% reduction in the incidence of polio ("Nigeria Millennium Development Goals Report," 2010).

While there have been gains, the World Bank’s Country Partnership Strategy (CPS) report indicates that the country is off-track for meeting most of the MDGs (The World Bank, 2009). A number of problems persist that limit economic growth and development, including: inadequate human development, inefficient agricultural systems, weak infrastructure, poor growth in manufacturing, an insufficient policy and regulatory environment, and mismanagement of resources ("Nigeria Millennium Development Goals Report," 2010).
Like many countries, Nigeria’s financial sector was negatively impacted by the recent global financial crises with a decline in oil revenue amounting to roughly one-third of the 2008 peak, reduced access to credit and weaker flows of private capital (The World Bank, 2009). The crisis confirmed the need to diversify the economy and strengthen fiscal management in order to achieve the desired development goals.

**Critical Criteria for Scalability**

**Innovation**

The strength of the innovation for this project is its simplicity and therefore, its ability to be easily replicated and adopted. The project is comprised of five innovations: a simple technology (a drying platform for the cassava peels to be used instead of burning the waste), a new product (clean dried cassava peels that can be sold as goat feed), an educational component (a diet prescribed to goat farmers, designed by animal scientists that utilizes cassava peels and maximizes the growth rate and health of the goats), access to credit (facilitating micro-credit loans to build the drying platforms), and a new market mechanism (linking cassava processors and goat keepers).

The drying platform is comprised of a raised cement platform covered with a durable black plastic tarp. The tarp is used to absorb the heat from the sun, which increases the drying time and can also be used as a quick cover to protect the cassava peels from the rain, a benefit greatly appreciated by the driers during the rainy season. The dimensions of the platform, while sometimes varied, are set to minimize the drying time. The raised design keeps the peels clean and protects them from being mingled with dirt and eaten by small animals.

The end product is clean dried cassava peels, often sold in large waterproof grain sacks at the local market or to nearby neighbors as livestock feed. The cassava peels from this project differentiate themselves from other cassava peels in that they are completely dried (wet cassava peels contain cyanide that is poisonous to animals and therefore not useful as feed) and free of dirt, unlike the peels that were previously dried on the ground. Goat farmers repeatedly mentioned their preference for the clean cassava peels from the drying platforms as a superior product to feed their animals.

Animal scientists from the University of Agriculture, Abeokuta designed a specific diet for the goats, comprised of dried cassava peels (30%) and grasses, legumes and roughages (70%) that maintains the health of the animals (reducing the cost of antibiotics and risk of death) and minimizes the time needed for the goats to reach their full growth (at which point they can be sold). In most cases the growth time is cut in half and the input cost of feed is drastically reduced, increasing the profit margin of the farmers by roughly $198 USD a year.
Providing access to credit is an important element of the project because it allows poor workers (either cassava processors or the women who peel the cassava) to purchase the materials needed to build the income-generating drying platform. The cost to build a platform is roughly $165 USD, an amount far beyond the resources of most rural farmers. (Note, that the original proposal estimated the cost to be much higher at $1,210 but many of the villagers build the platform themselves and use local materials (e.g., sand, water) which they are able to obtain free of cost.) While micro-credit is available in many parts of Nigeria, the standard interest rate is 22% and the loans require collateral. This project is able to partner with an NGO (SLIDEN AFRICA), who provides micro-credit loans at a one-time fee of 10% and without the burdensome restrictions of traditional loans.

Unfortunately, the project has suffered from a high default rate of 68%. According to the most recent report, a total of 651,800 N ($4,207 USD) was borrowed from 27 individuals, 21 of which defaulted. The credit program was subsequently put on hold. If the project is brought to scale, the micro-credit component will need to be re-designed and management may need to be handled by a different partner with more experience in micro-credit. The ability to provide loans to cassava driers is essential to ensure that the income-generating innovation benefits the most vulnerable, who, without access to credit, do not have the financial resources to set up a drying platform.

The fifth component of the project is the market mechanism linking the cassava driers with goat farmers. This is arguably the weakest component of the project and will need to be strengthened if the project is brought to scale. In theory the extension workers (state employees working directly with local farmers) connect cassava driers (sellers) with goat farmers (buyers). From conversations with both driers and buyers in several villages, the buying and selling process is informal and based largely on relationships and word of mouth. During the two-year pilot project phase, the demand was high enough that a stronger market mechanism was not required. However, if the project is brought to scale, more can be done to educate the driers on how to market their product and build relationships with both local and national markets, especially reaching markets in the north where cassava is not grown but where dried cassava peels could be sold for animal feed.

Theory of Change

The project produces social change by increasing the income of poor rural farmers, which improves their ability to cover basic necessities such as food, health care and school supplies, thus improving their quality of life and reducing the burden of poverty. The project introduces poor rural farmers to an income-generating product (drying platform), which can provide additional revenue, between $384 and $635 USD a year, minus the cost of building the platform ($165 USD). The majority of cassava driers are women who use the additional income to cover basic needs for their families. Since the project targets vulnerable populations living at the margins of poverty, the additional income is able to improve the living conditions of thousands of families. Likewise, the goat farmers also benefit by raising healthier goats in half the time, providing additional annual income that is often used to expand their business, buying additional goats and improving the pen where the goats are kept.
Benefits and Effectiveness of innovation

The Project Monitoring and Performance Assessment Team (PMPAT) visits the communities where the project is implemented to continuously assess the activities and objectives of the project and measure the performance against set goals.

The project aimed to reach 3,600 cassava processors and 600 goat-keepers, increasing their incomes by at least 15% from the sale of dried cassava waste and fast-growing goats in the two years of implementation (2008-2010). To accomplish this goal, the DM team originally planned to construct 24 drying platforms in 12 sites ("Development Marketplace Proposal #4345," 2008, pp. 1-2).

The project exceeded the original goal, expanding its reach to a greater number of communities. After the first 18 months (the final two-year report is expected in October 2011), the project was expanded to an additional 21 locations, resulting in a total of 33 drying platforms; 12 donated as demonstration platforms and 21 fully or partly funded with micro-credit loans facilitated by SLIDEN AFRICA for local cassava processors and goat farmers. The expansion to new locations was a result of pressure from agricultural extension officers and the communities they represent.

The project exceeded the goal of increasing the incomes of the beneficiaries by 15% ($198/year for goat farmers and $384/year for cassava processors). A sample of 40 direct beneficiaries found a monthly increase in income of over 39%, resulting in an average revenue gain of $635 USD (DM TEAM, October 1, 2010, p. 18). It should be noted that there was a wide variance in the revenue reported from the project; the higher incomes were in areas where other livestock keepers (especially cattle herders) compete for the cassava wastes and therefore the price of the dried cassava peels is higher. It is not clear that this is a representative sample and better data may be provided in the final report.

The general reach of the project was expanded from the original aim of reaching 3,600 cassava processors and 600 goat keepers to 6,078 cassava processors and 886 goat keepers. These numbers can be somewhat misleading in that they represent the number of people who heard about the project from the Agricultural Extension Officers. However, a much smaller number directly benefitted from the project. The last progress report, representing the first 18 months of the project, indicates that 278 cassava processors and 215 goat keepers directly benefitted from the 33 drying platforms (DM TEAM, October 1, 2010, p. 18).

Another essential element of the project is the market mechanism between cassava processors (sellers) and goat farmers (buyers). While no specific targets were set in the project objectives, the 18-month report indicated that 85% of cassava processors have direct linkages with livestock keepers and less than 14% have linkages with marketers (DM TEAM, October 1, 2010, p. 18). Interviews with cassava processors and the DM Team

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3 Income figures are based on a sample population and collected by members of the DM Team. An independent assessment of a larger representative sample is needed to verify the average income benefit.
during the August 2011 field visit revealed that this objective to create a market mechanism could be strengthened.

The environmental impact of burning cassava waste is one of the concerns addressed by the project. The goal was to eliminate the emission of carbon-monoxide and other toxins from 24 of the processing centers (100% of the originally planned drying platforms). By expanding the number of drying platforms used, the project was able to eliminate the harmful emission in 28 of the centers (DM TEAM, October 1, 2010, p. 18).

While the final results are yet to be tabulated, early evidence shows promise of commercial viability. Goat herders have demonstrated strong demand for the product as evidenced by sufficient demand during the pilot phase, even with limited marketing efforts and further by extension officers, who have expressed that the demand for the dried cassava peels is high among the thousands of farmers that they work with. The simplicity of the drying platform innovation and its relatively low cost is a clear economic gain for those able to obtain micro-credit loans. With an average cost of materials of $165 USD, depreciated over the anticipated 10-year life of the platform, the yearly cost to the owner of the drying platform is roughly $16.50 plus the possible replacement of the black tarp every few years. The innovation proves to be cost-effective with an average increase in annual income somewhere between $384 (original estimate) and $635 USD (preliminary findings).

Key Stakeholders

*Cassava Processors and Goat Keepers – Beneficiaries*

Cassava processors are entrepreneurs ranging from small scale, subsistence processors to medium and large-scale industrial processors who process cassava into different product forms including gari, starch, fufu, chips and ethanol. The main target of this project is small-scale female processors who benefit from increased incomes and the introduction of new livelihood opportunities.

Goat keepers are farmers who either rear goats as their sole economic activity or in combination with other animals and/or crops. The goat keepers seen during the case study site visit, have small pens housing 8-10 goats.

*University of Agriculture, Abeokuta (UNAAB) – Implementing Agency*

The existing project was started in Ogun State by the University of Agriculture in Abeokuta (UNAAB). Dr. Kolawole Adebayo, a Senior Lecturer at the University and an expert on cassava and rural development, recognized the opportunity to create a market mechanism to transform cassava waste into a product that can be sold to goat farmers, providing additional income to both the cassava processors and goat keepers. UNAAB has served as the implementing agency, monitoring the World Bank Development Marketplace funding and providing researchers, including Dr. Adebayo, to coordinate the partners and monitor and evaluate the project.
Established in 1988, the University of Agriculture, Abeokuta is one of three universities of agriculture established by the Federal government of Nigeria. Located on a 24,000-acre campus, the University runs livestock farms for teaching and research as well as permanent crop plantations and serves 6,000 undergraduate and 1,500 postgraduate students with 51 professors and 274 academic staff ("Development Marketplace Proposal #4345," 2008). In 2003, the University was recognized as the best university in Nigeria in the area of students/faculty staff ratio and research activities ("Historical Background of 'Nimbe Adedipe Library, UNAAB,""). Further, the University offers expertise in the cassava industry and working with national and international agencies. Between 1999 and 2006, UNAAB worked to commercialize local cassava products and has worked with a number of companies including NESTLE Food Plc, the International Institute of Tropical Agriculture and the International Foundation for Science.

**Ogun State Agricultural Development Programme (OGADEP) – Government Partner**

Ogun State Agricultural Development Programme (OGADEP) is the agency responsible for providing agricultural services in Ogun State. Established in 1986 as one of the first Agricultural Development Programs (ADPs) in Nigeria, it was initially supported through a tripartite funding arrangement including the World Bank, the Federal Republic of Nigeria and Ogun State government. The World Bank ceased its funding in 1995 and OGADEP has since been run as an agency of the Government of Ogun State. The agency works to facilitate increased food production, productivity, and income and to improve the standard of living of small-scale farmers in the state. OGADEP employs 120 Village Extension Agents (VEAs) that live and work in the communities and are in direct contact with the farmers, as well as 20 Block Extension Officers (BEO), 20 women Block Extension Agents (BEAs) and 4 Zonal Extension Officers (ZEO) that provide agricultural extension services to all areas of Ogun State. The agency also has a team of Subject-Matter Specialists (SMSs) and Research Assistants who work with research institutes and universities to adopt available technologies to local conditions.

In this project, OGADEP provides the village extension workers to identify local beneficiaries of the project, recommend potential beneficiaries for micro-credit loans, train consumers on the recommended drying techniques and feeding regime and monitor implementation of the drying platforms. Prior to implementation of the DM08 project, the extension officers were conducting training programs on the processing and utilization of unfermented cassava flour and were therefore well situated to introduce the drying platform technology. The role of OGADEP is essential to the success of the project, having an existing human infrastructure that can reach all the villages in the State. ADPs like OGADEP are in every state in Nigeria and can be utilized if the project is brought to scale.

**UNAAB Micro-Finance Bank – Micro-Credit Partner**

UNAAB Micro-Finance Bank Limited is the banking entity that serves the University community and the entire farming community around the University campus. The Bank is actively involved in loan services and small credit facilities for the farming population near the University. For this project, the bank acts as the main credit institution that guarantees
credit facilities for beneficiaries of the project and works closely with the NGO, SLIDEN AFRICA, who disburses the loans, monitors its use and ensures repayment.

**SLIDEN AFRICA – NGO, Micro-Credit Partner**

SLIDEN AFRICA is a non-governmental organization (NGO) based in Nigeria with offices in Kenya and Ghana. Established in 2000, SLIDEN AFRICA is comprised of a network of partners—professionals in the Agriculture, Development Studies and related fields. Their work is focused on empowerment of poor people in rural Africa through poverty alleviation, livelihoods development, skill enhancement and gender parity in development, research and information networking. Their current role in the project is to facilitate credit services to beneficiaries, though the program is currently on hold due to high default rates. This is their first experience managing a micro-finance program and it is not evident that they have the appropriate expertise to maintain this role. While the high default rate is not uncharacteristic for Nigeria, it is mostly due in part to the design of the program, which lacks an educational component (arguably necessary when lending to a population that has no experience borrowing money) and a community/group approach that has been proven to create greater accountability and higher repayment rates.

**World Bank – Funding Partner**

The Agriculture and Rural Development Department of the World Bank provided the initial funding for this project through the 2008 Development Marketplace Competitive Grant process. Funding for the two-year pilot phase totaled $170,038 and was matched with $68,880 in non-DM funds ($21,180 from UNAAB and $47,700 from OGADEP for personnel costs). The World Bank Country Office, based in Abuja has provided exceptional leadership of the project under the supervision of Dr. Adubi, who also oversees FADAMA III and is interested in seeing the project be brought to scale.

**FADAMA III – World Bank Community Development Partner**

The most recent partner, FADAMA III, was introduced to the project by Dr. Adubi, the World Bank Country Team Leader, who oversees both the DM2008 project and FADAMA III. With a $450 million budget: $250 million from the World Bank and $200 million from the Federal, State and local government, FADAMA III builds upon the success of FADAMA I & II to increase the incomes of land and water resource users in a sustainable manner. The objective is to increase incomes in order to help reduce rural poverty, increase food security and contribute to the achievement of the Millennium Development Goals (MDGs). FADAMA III has the benefit of working in all 36 states and the federal capital territory and is already working in the communities where the DM cassava project currently operates and could help introduce the project to additional communities in the rest of Nigeria.

In addition to its presence in the rural agriculture community, FADAMA III offers a number of benefits to the DM project, including a group/community approach to development. Rather than targeting individual farmers or rural community members, FADAMA only works with groups within a community, usually comprised of women. The group dimension brings encouragement, accountability and greater sustainability. The difference is notable. After visiting numerous villages were the DM08 cassava project had been
targeted to individuals, a visit to a village where a FADAMA III/DM08 project was implemented in a group setting, was notable for the vibrancy and enthusiasm of the women. Together, they were setting goals and working to benefit their community. If brought to scale in partnership with FADAMA, the cassava project will be able to take advantage of the group model and capitalize on the energy and accountability that comes with group ownership. Further, Dr. Adubi expressed interest in including a micro-credit component to FADAMA’s work that could be used for the cassava project and which would most likely include an educational/training component on money management and business skills and would be offered in a group context, providing incentives for repayment in the form of social pressure and group accountability.

**Core Project Team (CPT)**

A Core Project Team, composed of an agricultural extension expert/team leader, an agricultural economist, an agricultural engineer and an animal production expert from the University of Agriculture, Abeokuta along with the Director of Extension Services and the Assistant Chief Planning Officer from OGADEP, worked together to implement the cassava drying technology in Ogun State. In addition to the CPT, 12 Village Extension Agents, supervised by four Zonal Extension Officers provided field level extension visits. A staff comprised of local NGOs provided independent assistance for the Project Monitoring and Performance Assessment Team (PMPAT), who monitored all project activities and provided feedback on how to improve the project and achieve better results.

**Alignment with Government and World Bank Strategies**

The Government of Nigeria has demonstrated commitment to growing and expanding the cassava industry. In 2002, the Federal Government presented the Presidential Initiative on Cassava with the goal to achieve self-sufficiency in food production and to provide foreign exchange income for the country. The Initiative included mandates for the use of cassava products (namely cassava flour and ethanol) in certain industries. As a result, it reduced reliance on imports and boosted local industries involved in the processing of cassava products. The increased demand for cassava resulted in widespread job creation and benefited farmers throughout the country, providing employment opportunities for those previously unemployed. While the initiative helped to expand the cassava industry, it was later modified under the late President Yar’Adua and the changes went into effect in 2008. The revised initiative relaxed the previous cassava mandates, which in turn, reduced the demand for cassava products. As a result there has been some decline in the cassava industry ("Nigeria: The Presidential Initiative On Cassava," 2010). Despite the weakened mandate, the government remains supportive of the industry and the DM08 project can provide employment opportunities for those who may have been affected by the change.

The World Bank’s strategy in Nigeria is a complement to the Government of Nigeria’s and focuses on improving governance, maintaining non-oil growth and promoting human development. The Country Assistance Strategy (CAS) and the Country Partnership Strategy-CPS II (a detailed strategy representative of the major donor agencies including the Department for International Development (DFID), the United States Agency for
International Development (USAID), and the African Development Bank (AfDB)) outlines the Bank’s full strategy along with the Bank’s Agriculture Action Plan for 2010-2012 which endeavors to link small farmers to markets and promote the contribution of agriculture to environmental services that mitigate climate change. The Action Plan’s strategies include raising agricultural productivity, linking farmers to markets and strengthening value chains, reducing risk and vulnerability (by increasing incomes), and enhancing environmental services.

The cassava project aligns with the goals of maintaining non-oil growth and promoting human development. The cassava industry represents a large non-oil industry that can be expanded and made more efficient to provide economic growth. Further, to the extent that it has already expanded, the cassava waste project mitigates the environmental damage caused by the sector’s growth and also creates employment opportunities for the rural poor. The income generated by the program helps achieve the human development objectives by allowing farmers to earn additional income to cover basic necessities such as food, healthcare costs and school fees.

Assessment of Scalability of the Innovation

Given the success of the two-year pilot phase of the DM08 project and its alignment with the Nigerian Government and World Bank’s strategies, the next step is to assess how the project could be brought to scale. In preparing a plan for scaling, we draw on the Management Systems International (Cooley & Kohl, 2006) three step, ten task framework for scaling.

Step 1: Develop a Scaling Up Plan

Task 1—Develop a Vision: the Project’s vision will ultimately need to be decided in collaboration with the partner organizations. Based on communication with the World Bank and existing partners, a draft vision is: to improve the lives of poor rural farmers by creating an income generating opportunity that provides economic growth for the country of Nigeria and mitigates harm to the environment. If the goal is to expand the project not only beyond Ogun State, but also outside of Nigeria, the final vision should reflect the projected reach of the project.

Task 2—Assess Scalability:

Forces or Drivers:

In assessing the potential of a project to be brought to scale we look at the factors that influence the drivers of change—the credibility of the innovation, leadership capacities and commitment, champions, constituencies and incentives.

The credibility of the innovation is evident from the success of the pilot project and is reflected in the demand for the drying platforms and dried cassava peels. The project aligns with traditional practices and cultural norms by focusing on cassava processors and goat herders in a country where over 86% of the land is used for agricultural purposes. The
cassava industry is widespread throughout the southern and central states and small-scale goat farms have a presence throughout the country. The drying platform takes advantage of an existing industry and provides a product (cassava peels) that is already being used, but provides an improved product (clean peels that are dried off of the ground) and packaged as a product that goat feeders can purchase.

There has been widespread support for the project from agricultural extension agents working at the community level, leadership from OGADEP demonstrating state support, the University of Abeokuta, providing research and coordination as well as connection with other Universities and research institutions throughout Nigeria, and existing beneficiaries who are demonstrating the advantages of the drying platforms and feeding regimens to their neighbors. However, it is not clear that there is a main champion who is advocating for scaling up the project and who will mobilize support across the states. As evidenced in the literature, a champion of the project plays an important role in garnering the necessary political support and bringing together the partners needed to scale the project. In the absence of a clear champion, the project will need to rely on the funder and implementing agency to fill this role until a champion can be identified.

There are a number of benefits for scaling up the innovation—reducing environmental pollution from burning cassava waste in all regions where cassava is produced; increasing income opportunities for poor rural farmers which can then be used to improve access to healthcare, education and ensuring adequate food and shelter; and improving the health of livestock throughout the country. However, it is not clear that there are true incentives for the federal or state government to scale up the project. The benefits may be enough to motivate the government and partner agencies to expand the project but the project does not have the kind of incentives that would help ensure the cooperation of the needed partner agencies.

Once a plan to scale up is reached, mechanisms will need to be in place to hold the implementing organization accountable for scaling up according to the plan. Determining the appropriate mechanisms will in part depend on who the implementing organization is, but regardless, funding will most likely be in the form of a grant to the implementing organization with a clear grant agreement that outlines the roles and responsibilities of the partners. There will also be checks and balances with a partnership model. Before the project is implemented in new states, there will need to be a clear written plan that all partners agree to, outlining roles and responsibilities.

**Spaces for Scaling Up the Innovation:**

The innovation fits within the federal government’s general plan for growth of the cassava industry, caring for the environment and human development. While the federal government was not directly involved in the pilot project phase, it may need to take a larger role in bringing the project to scale. It potentially offers both the ability to provide funding and the capability of bringing the necessary partners (including the Ministry of Agriculture/ ADPs) together throughout the country.
At the State level, the Agricultural Development Programs (ADPs), with their network of extension workers operating in rural communities, have the capacity to provide the personnel needed to bring the innovation to scale. OGADEP, the ADP for Ogun State expressed confidence that ADPs throughout the country would be amenable to adopting the innovation because of the project’s fit with the ADP’s mandate. However, funding may be needed to cover the costs of fuel and incidentals for the Extension Officers to meet with community members and spread information about the innovation.

Scaling of the innovation will require relatively modest funding, primarily for personnel costs of the implementing organization to coordinate all partners and for the materials and labor to construct the demonstration platforms. Once the innovation has spread, farmers will be able to see the benefit of the drying platform and the innovation can spread by word of mouth. It is likely that the state government can provide indirect financial support in terms of personnel (e.g., extension officers). At the federal level, the government has the capacity to support the project financially but they will need to be included in the discussion to assess their willingness to support the project.

Task 3—Fill Information Gaps: If the project goes to scale, appropriate partners will need to be selected in each new state. The University of Agriculture in Abeokuta can provide recommendations on Universities and Research Institutes. There is an alliance of NGOs in Abuja that provides information on the NGOs working in each state and what their specialties are. The World Bank Country Office can also lend its expertise in selecting the most appropriate NGOs to work with. FADAMA III may implement a micro-finance component to its program and they may be able to manage the micro-credit component of the project or work in partnership with an NGO who can manage the loans.

Task 4—Prepare A Scaling Up Plan: Once a decision is reached to scale the project, a more detailed plan will need to be created for how the project will be scaled, the degree to which it will be scaled (what communities and States will be targeted for inclusion), what partners will be included (it may require different partners in different states), what level of funding is needed, over how many years (timeframe); who will fund the scaling up and whether there will be matching requirements.

Step 2: Establish the Preconditions for an Effective Scaling up Process

Task 5—Legitimize change (“getting the issue on the agenda”): The cassava drying project benefits from the government’s expressed support for expanding the cassava industry, creating jobs and taking care of the environment; however, without a champion, significant work remains to get the issue on the agenda of all levels of government and to bring in the necessary partners in each new state.

Task 6—Build Constituency (“building bridges”): The two-year pilot phase of the project succeeded in building constituency among the current partners. If the project expands to new states, it will require additional partners. DM08 partners play a critical role in identifying their counterparts in other states (e.g., agricultural development programs, research institutes, NGOs) to bring on as new partners to replicate the project in other states.
Task 7—Realign and Mobilize Resources: DM08 funding has been expended. If the project is brought to scale, it will require funding commiserate with the size of the expansion. The World Bank will need to determine if it is able to provide funding to scale the innovation or if it can find other funders to support the project expansion. The hope is that the World Bank will not abandon the project after the two-year development marketplace funding but that it will work with the federal government and other funders, to take advantage of the success of the project and maximize its impact. If the World Bank does not provide or facilitate funding, the project partners will need to identify a champion who can seek out other sources of funding to help bring the project to scale.

Step 3: Implementing the Scaling up Process

Task 8—Modify and Strengthen Organizations: This task will depend on what partners are selected in each state the project expands to. Of the initial partners, the coordination of the micro-finance component will need to be modified (a new NGO or FADAMA III may be selected to take over) or strengthened (a new lending model implemented to ensure higher repayment rates).

Task 9—Coordination Action: During the pilot phase, the University of Agriculture in Abeokuta successfully coordinated the work of the partners. An increased level of coordination will be required to bring the project to scale; it is possible that UNAAB may continue this role, or a large NGO could take over. Alternatively, the federal government could potentially take a lead coordinating role. Whatever agency coordinates the scaling process will need to have the clout and respect to manage any potential tensions between partners. While relations between the partners during the pilot phase were generally very positive, there was some indication of tension between the state level Agriculture Development Programs (ADPs) and FADAMA III. Interviews with World Bank Country Office and UNAAB representatives mentioned existing tension between FADAMA III, who provides the funding for community development projects and who has the mandate to implement programs independently, and the ADPs who want to control the projects. The tension appears manageable but nevertheless, the coordinating partner plays an important role in mitigating and clarifying the roles of all partners.

Task 10—Track Performance and Maintain Momentum: During the pilot phase, UNAAB established a monitoring and evaluation team that went into the communities where the drying platforms are installed and met with the agricultural extension agents and the beneficiaries of the project (cassava processors/ driers and goat herders) to monitor the performance (e.g., feeding regime, health and growth of goats, marketing and sales of dried cassava peels, increase in income). The evaluation and monitoring team was comprised of members from UNAAB (the University), OGADEP (the State ADP), and SLIDEN AFRICA (Micro-credit NGO). A similar monitoring and evaluation team will need to be established in each state that the project is implemented in, in order to track performance and maintain momentum by listening to the local communities and beneficiaries and spreading information on the value of the innovation and increase adoption of the technology.
Type of Scaling

Building on the success in Ogun State, the project can be scaled by replicating the DM08 project in additional states. IFAD (the International Fund for Agriculture and Development) provides a conceptual model for scaling up that can be applied to the case study at hand (Linn & Hartmann, 2010). Their model focuses on the organizational and institutional aspects of scaling—the drivers of scaling up and the financial, political and organizational components required for scaling—and emphasizes the importance of monitoring and evaluation.

The current case study began with the idea to prevent the burning of cassava peels by drying them and turning them into a marketable product that could be used as nutritious feed for goats. The idea was then tested during a pilot project phase in Ogun State with the help of DM08 Marketplace Development funding. A team regularly monitored and evaluated the project, collecting data and interviewing the beneficiaries. From this learning exercise, we discovered important lessons that inform if the project should be scaled and how it should be modified if it is brought to scale. Lessons learned include:

- Goat farmers were willing to pay for dried cassava peels.
- When providing micro-credit, the distance between where the farmers live and work and where they need to complete the loan paperwork discourages poor, uneducated farmers from securing loans and taking advantage of the innovation. In more remote communities, the only people with drying platforms are those that did not require loans and who were therefore, not the most vulnerable in the community.
- Dried cassava peels are desired as livestock feed for animals besides goats (e.g., pigs, cattle).
- The price of cassava peels varies depending on the demand and therefore the income generating benefit varies widely depending on the location.
• Introducing the innovation to community groups instead of individuals is perhaps a more desirable model for the number of people that it benefits and the support that the women provide each other.

The pilot phase provides the benefit of learning what worked, what didn’t and how the innovation can be improved if it is brought to scale. Based on the success in Ogun State, the project can be replicated in additional states to maximize the benefit of the innovation.

Implementing Organization – Strengths and Weaknesses Analysis

The implementing organization will be specific to each state and selected in the next phase of planning. FADAMA III has the organizational capacity and national presence to implement the project but is limited by its funding time frame, which is set to expire in December 2013. UNAAB was the implementing organization during the pilot phase and will continue to play a role in the project expansion but may not have the geographical reach to serve as the implementing organization outside of Ogun State. From the pilot phase it is evident that the University is a great asset to the project and offers the expertise, vision and capacity to implement the project.

As a research University specializing in agriculture and development, UNAAB offers the expertise of numerous researchers including Dr. Adebayo, the project team leader who originated the initial project innovation. Dr. Adebayo is a Senior Lecturer at UNAAB and has worked for 21 years as an extension officer, rural development expert and lecturer. His area of expertise is in the uptake and dissemination of agricultural innovations in smallholder farming systems, management and sustainable funding of agricultural development as well as rural livelihoods and management of the environment.

Housed within the University of Agriculture, the College of Agricultural Management and Rural Development (COLAMRUD) operates with the objective "to assist in the attainment of self-sufficiency in the production of basic food; contribute to the marked increase in the production of agricultural raw materials to support the growth of industries; to enhance the production and processing of export produce; to enhance the rural employment opportunities and to evolve effective ways of protecting agricultural land resources from ecological degradation ("College of Agricultural Management and Rural Development (COLAMRUD)," 2011). The objectives of COLAMRUD and UNAAB with the DM08 project helped to ensure the integrity of the project implementation in Ogun State. This alignment of vision is an important component in the selection of an implementing organization in other states.

As the recipient of numerous research grants, a University has the experience and capacity to manage the funds if the project is brought to scale. With the need to maintain its reputation in the field, the University has the incentive to provide appropriate oversight over the project. Because the administration of grant funding is separate from the implementation of the project, it offers additional oversight to ensure that the integrity of the project is maintained and that the funds are used for their intended purpose.
As one of the top University’s in the country, UNAAB maintains relationship with the other Universities and research institutions within Nigeria specializing in agriculture. This relationship network can be leveraged to help bring together the appropriate partners in each state where the project is implemented. Prof. Segun Apantaku, Dean of COLAMRUD confirmed the commitment of the University to do whatever they can to help bring the project to scale.

UNAAB and similar Universities provide the additional benefit of being a neutral partner, free of the competitive relationship of FADAMA and OGADEP, and with the respect and proven ability to work with multiple partners.

The University benefits from the leadership of Dr. Adebayo, the project team leader. While his leadership has been valuable to the project it is important that the implementing organization not be dependent on a single individual. UNAAB was able to utilize a team of researchers from the University to avoid this potential pitfall and in the future could consider utilizing students in the training and dissemination of the innovation.

**Partner Organizations**

Partner organizations will need to be selected for every state in Nigeria that the project is implemented in, and while the roles and responsibilities will remain fairly uniform, the actual organizations will differ from state to state. The pilot phase provided a successful model that can be replicated in additional states.

**State Agricultural Development Programs**

An essential partner to the project is the Agricultural Development Program (ADP) operated within every state in Nigeria. The ADPs provide a network of Agricultural Extension Officers who are able to disseminate the innovation to the local communities. The Core Program Team trains the extension officers who then demonstrate the benefits of the drying platform to the farmers in the rural communities where they work. The extension offers not only introduce the innovation to potential beneficiaries, they are also able to help with the market mechanism by connecting buyers (goat farmers) with sellers (cassava processors). Because they have a close relationship with the villagers, they are able to recommend potential beneficiaries for micro-credit loans. Without the presence of the extension officers the innovation would be far more costly and difficult to implement. The partnership with OGADEP in Ogun State has worked well and Mr. Niyi Phillip, the Project Manager for OGADEP conveyed confidence that ADPs in other states would be willing to partner with the project.

The ADPs receive their funding from the state and would most likely be able to offer the use of their extension officers but they may not have room in their budget for incidentals (e.g. fuel) that the extension officers would need to disseminate the innovation. A more detailed discussion is needed with each ADP as part of the planning phase for scaling.
Coordination between the implementing organization (UNAAB), the Core Program Team, FADAMA III and the ADP would be relatively straightforward. The Core Program Team trains the extension officers, the extension officers disseminate the innovation in coordination with FADAMA III and the monitoring and evaluation group ensures that the innovation is being implemented appropriately. Because FADAMA III and the ADPs are already working together in a similar capacity, it should be a natural synergy but in situations where there is conflict over roles, the project team leader will be a neutral party that can mitigate and coordinate all partners.

**FADAMA III**

The development objective of the World Bank-funded FADAMA III Project is to sustainably increase the incomes of rural communities. By increasing incomes, the project will help reduce rural poverty, increase food security and contribute to the achievement of a key millennium development goal. The project aims to directly deliver resources to the beneficiary rural communities, efficiently and effectively, and empower them to collectively decide on how resources are allocated and managed for their livelihood activities (World Bank, 2008).

FADAMA III has the benefit of already working throughout Nigeria in the communities that would benefit most from the drying platform innovation. In some areas they are working directly with cassava processors, in which case a drying platform can be easily added to provide additional income to the women who use it. As previously discussed, FADAMA III uses a group/community approach to development which allows a greater number of people to benefit and offers the encouragement and support that comes from working together. The group approach is also beneficial when offering micro-credit. Dr. Adubi, the World Bank Team Leader of FADAMA III and the DM08 project indicated that FADAMA III is currently studying the use of micro-finance in South-East Asia and considering implementing a micro-credit component to the work of FADAMA. If implemented, the loan program could potentially include the cassava drying project. FADAMA III is interested in using the group model to provide accountability for the borrowers and to include educational trainings on how to manage money, repay loans, and build a business. An NGO may still be involved to manage the micro-credit accounts and payments. FADAMA III provides a presence in the rural communities, an expertise in agriculture and development, a group model and potentially, access to micro-credit for the users.

The main drawback to FADAMA III is that its funding and mandate expire at the end of 2013. Already in its third phase, it is possible that funding will be renewed for a FADAMA IV but this was not discussed and the likelihood of this is not known. With less than a year and half left of operation, FADAMA III can propel the scaling process but cannot be counted on for the full timeframe needed to bring the project to scale.
**University or Research Institution**

There are three Universities of Agriculture in Nigeria and several other research institutions that could serve as partners in the different regions where the project may be scaled. The benefit of maintaining a regional University or research institution in the scaling phase is to help maintain the integrity of the program with their expertise in animal science, agriculture and development. While the innovation itself is relatively simple, we learned from the pilot phase that driers will often try to modify the drying platform (e.g., dimensions and materials used), which can reduce its effectiveness. Further, maintaining the appropriate feed regimen for the goats is important to maintain optimal results. Aspects of the innovation may need to be adjusted to adapt to regional differences. Having a partner with the technical expertise to help with trainings, compliance and modifications is important to maintaining the integrity of the project. The specific Universities and research institutions in each state will need to be identified during the planning phase. Both the Dean of COLAMRUD and the Project Team Leader at UNAAB expressed their willingness to help identify and recruit the necessary research partners.

**NGO (Management of Micro-finance)**

The current partner NGO, SLIDEN AFRICA works throughout Nigeria but their presence outside of Ogun State (location of the pilot phase) is minimal. While Dr. Adebayo, the Project Team Leader is comfortable with maintaining their role as a partner based on their experience and knowledge of the project, there are NGOs with greater expertise that could be brought in. Depending on the geographical reach of the NGOs, it might be necessary to partner with different NGOs in each State where the project is replicated. Compared to other countries in Africa, Nigeria is not considered a friendly environment for NGOs; as a result, it lacks a large presence of international NGOs but does maintain a network of local NGOs that can be used. During the planning phase, the World Bank Country Office, in connection with the alliance of NGOs in Abuja, should be able to offer advise on which NGOs to consider for partnership.

Depending on the other partners in each State, the main role of the NGO will most likely be to manage the micro-credit component of the project. If FADAMA assumes this role, they may still want to work with an NGO to manage the loans and repayment. The team should wait to select an NGO partner until it is clear what the needs are that the partner will be addressing.

**Intermediary Organizations**

It is not evident that an intermediary organization will need to be brought in for the scaling up process. With the existing model, UNAAB will be able to coordinate bringing in the appropriate partners in each State that the innovation is introduced in. Given the number of partners involved and their individual expertise, the partners collectively contain the skills needed to bring the innovation to scale. It is possible that the implementing organization could benefit from the expertise of a consulting firm to help with marketing.
the innovation and preparing the communication, but this is not essential to the success of the project.

There remains an important role for the World Bank, both as a funder and as a partner with FADAMA III. The project has the support of the government and a network of partners available to bring the project to scale. By leveraging the presence of ADPs and FADAMA III in the rural communities, the cost to introduce the DM08 innovation is modest. However, no outside funding for the scaling process has been identified to date. Funding from the Federal Government of Nigeria, the World Bank or an organization introduced by the Bank, would help make the scaling possible.

Next Steps

The next phase of the project will be to decide if the innovation should be brought to scale and to secure funding. This will include involving the Federal Government of Nigeria and assessing the possibility of its role in helping to facilitate and finance the replication of the project throughout Nigeria. The World Bank Country Office can play an important role in bringing in the Federal Government in the next phase and securing the key partners needed to replicate the project. One possibility is to organize a conference that brings the partners together and introduce the innovation to the Federal Government. Once funding has been identified, the planning can proceed.

Conclusion and Recommendations:

Nigeria is a country with the organizational capacity and resources needed to bring the DM08 innovation to scale. As the leading producer of cassava in the world, Nigeria has enormous potential to replicate the cassava-drying project throughout the country and take advantage of the increased economic and environmental benefits. With the infusion of the necessary funding, the benefits experienced in the DM08 pilot phase can be more fully realized in the other States within Nigeria and beyond.

It should be noted that while the project meets most of the criteria necessary to scale up throughout Nigeria, it lacks a champion and true incentives. A champion plays an important role in advocating for the innovation and bringing together the necessary players; without a champion, the project will require the cooperation of all partners to go to scale. Further, the innovation boasts a number of benefits—from economic growth, to mitigating environmental degradation—but lacks explicit incentives to ensure replication.

Nevertheless, the project has enormous potential to be scaled. From the two-year development marketplace funding, the project has demonstrated evidence of indigenous organizational and leadership capacity; demand for the drying platform and clean, dried cassava peels as a marketable product that goat farmers are willing to purchase. The project proved to be financially viable with lower building costs and higher revenue gain than expected. The partners have expressed their commitment to expand the project and bring on other partners if the necessary funding is secured. If scaled, the project will be able to benefit additional rural communities throughout Nigeria, raising the incomes of
poor farmers, helping them to meet their family’s basic needs (e.g., food, housing, education and health) and improving the health of all Nigerians by reducing the release of environmental toxins from the burning of cassava peels.

We recommend that the innovation be brought to scale and offer three recommendations for the scaling process:

1.) **Re-introduce a micro-credit component** to ensure that the poorest of the poor have access to credit and can therefore, take advantage of the innovation. The original micro-credit program run by SLIDEN AFRICA had a default rate of 68%; a rate that proved unsustainable to maintain and the program was subsequently put on hold. Without access to credit, the innovation will primarily benefit those with the economic means to build a drying platform. According to the World Bank Country Office, the default rate is not unusual for Nigeria but both the implementing agency and the World Bank Office agreed that a lower default rate is possible. Modeling successful micro-credit programs in South-East Asia, FADAMA III is considering providing micro-credit and utilizing its group model to provide greater accountability and financial education to complement the loans. Including an educational component to the loan program is important to ensure that this new population of borrowers have the skills needed to grow their business and repay the loans. Whether through FADAMA III, a new NGO or SLIDEN AFRICA, the micro-credit component should be reintroduced and revised to ensure a lower default rate while still providing loans to the poorest of the poor.

2.) Increase the benefits of the project by **strengthening the market mechanism**. The original project created a new market by introducing a product (dried cassava peels) that could be sold for profit. While there was sufficient demand for the project at the pilot level; scaling up the project will necessitate selling a greater quantity of dried cassava peels and would benefit from a plan to market the cassava peels to goat farmers and other livestock owners (the best results are seen in goats but cassava peels can be used as feed for pigs and cattle as well). When the cassava driers are trained on the benefits of the drying platform they could also receive training on how to market their product to a larger consumer base. Currently most cassava processors sell the peels informally to neighbors or at the local market. Uniform branding and packaging of the product may also help build name recognition and a reputation for the product that would increase demand.

3.) **Partner with FADAMA III and adopt the community-centered model.** FADAMA III is the most recent partner, brought on after the original pilot phase ended. The World Bank, as a funder of FADAMA III can provide further support to the DM08 project by utilizing the network of FADAMA III projects throughout Nigeria and the group model it uses with its development projects. Further if FADAMA III employs a micro-credit program, this could potentially be used to provide loans for the cassava processors. Keeping in mind that FADAMA III is only funded through December 2013, its relationship with the project should serve primarily as an entry point to new communities throughout Nigeria and adoption of a group-focused model.
The DM2008 project, *Adding Value to Waste in the Cassava Processing—Goat Keeping Systems in Nigeria* (4345) offers a simple innovation that reduces environmental degradation and provides additional income to a rural poor population. The pilot phase demonstrated demand for the drying platform, which was successfully implemented in a total of 33 villages—21 more than originally planned, providing an average increase in income of $635 USD a year. Goat farmers proved their willingness to purchase clean dried cassava peels, which they fed to their goats and saw a return on their investment in the form of healthier goats, who reached their full growth in half the time. The success was due in large part to a partnership that leveraged the network of agricultural extension agents and benefited from the training and technical expertise of the economists and scientists at UNAAB, access to credit to build the drying platforms and later, the FADAMA III community model and their experience increasing incomes in rural communities. The project aligns with the goal of the Federal Government of Nigeria to expand the cassava industry; the World Bank, to care for the environment and provide non-oil growth and the Millennium Development Goal to halve poverty by 2015. With the infusion of modest funding, the innovation can be brought to scale and benefit thousands of rural farmers in Nigeria and beyond.
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