

## **Increasing cassava productivity in Nigeria: The commodity value chain development approach**

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### **Abstract**

The cassava value chain development approach was put into use in the last one year to transform the cassava productivity in some selected states of Nigeria by creating linkages between sustainable supply of raw materials and the large scale cassava processors. In this market-led model, farmers are empowered to use best agronomic practices and disease resistant cassava varieties to increase their yields, while readiness of major input dealers to provide agro-chemicals to the farmers at affordable prices, and loans from the financial institution is facilitated. The project is also highly responsive to emerging opportunities that enable the value chain to be efficient, for example establishment of demonstration plots for farmers' training and commercial weed control business groups who can assist farmers with cost effective weed control practices are brought into the arrangement.

Three major cassava processing companies which are providing a sustainable market outlet for the farm produce for a minimum of 1000 farmers were involved in the model. A total of 112 sustainable farmers groups were created in the 2009 planting season. This led to the establishment of 1304ha under improved technologies or management practice. Six (6) technologies or management practices were made available for transfer to farmers and investigations indicate that about 85% of farmers are adopting all the improved technologies made available for transfer to farmers except the use of fertilizers. Over 200 farmers were gainfully employed as agrochemical sprayers and sellers, while over USD100,000 was realized as income generated from stem sales in the project states. Full business operation has resumed again in these cassava processing companies. This paper therefore shows that market-led as demand driven cassava development approach can lead to efficiency in the crop, generates employment for youth and should be promoted.

### **Introduction**

In designing an effective and sustainable approach that will promote competitive cassava sub-sector

in an evolving consumer-preference system in Nigeria, it was important to establish: the reliability and efficiency of the input system, the effect of adoption of improved production technologies by farmers, the contribution of the value-addition through best processing practices and the contribution of effective linkages between major actors in the cassava value chain. It was against this background that the Maximizing Agriculture and Key Enterprises in Targeted Site (MARKETS) and IITA initiated a holistic commodity development chain approach in 2009 in conjunction with selected agro-processors (EKHA Agro, MATNA Foods and NSM) the south-west and south-east of Nigeria. The objective were to support large-scale cassava agro-processors, expand economic opportunities in the cassava industry by increasing productivity, enhancing value-added processing, and increasing commercialization through private-sector led and market-driven growth and development.

### **The Genesis**

Cassava is one of the most important crops for Nigerian agriculture. It is widely cultivated and provides food and income for nearly 30 million farmers (Ezedinma, 2006). However, the crop is threatened by Cassava Mosaic Virus Disease (CMD) which devastated crops in Uganda in the late 1980s (Ogbe, 2001). By 1999, CMD had become a pandemic in East and Central Africa where it caused up to 100 percent loss of the crop. In 2001, a diagnostic survey of CMD by IITA in farmers' fields of 17 States found that mixed infections of the viruses are now widespread in southern Nigeria (Figure 1). This situation posed a threat to the entire cassava industry in Nigeria.

### **The fast-track participatory selection approach**

To mitigate this possible setback, the strategy adopted was to assemble a large pool of human resources from NARS, the universities, industry, government, farmers, and processors to engage in breeding/evaluation activities. The objective was to facilitate cultivar-substitution by replacing the susceptible varieties on farmers' fields with superior genotypes that were not only CMD resistant/tolerant but also high yielding (Figure 2). From this exercise, 12 new varieties (TMS 98/0510, TMS 98/0581, TMS 98/0505, TMS 97/2205, TME 419, TMS 92/0326, TMS 96/1632, TMS 98/0002, TMS 92/0057, NR87184, THS 96/1089, and NR 930199) were officially released by the Nigerian National Variety Release Committee in only 4 years (2005-2008). These

varieties are resistant/tolerant to CMD, and other major pests and diseases of cassava, such as bacterial blight, anthracnose, cassava green mite, and cassava mealy bug. They are also high yielding (25-40 tons/ha compared to the national average yield of 10-12 tons/ha; Figure 3), early maturing (about 10-12 months compared to 18-24 months for the old varieties) and suitable for food, industry, and livestock feed.

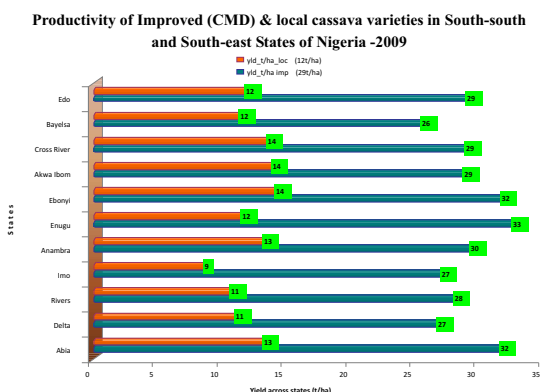


Figure 1: Histogram showing yield in various States

### Improving on-farm productivity for large-scale processors

Recently, this large pool of improved cassava germplasm was used to increase the on-farm productivity of farmers supplying tubers to large-scale processing industries. These agro-processors are: EKHA Agro (specializes in glucose syrup), MATNA (Starch production) both in the southwest of Nigeria, and NSM (industrial starch), south-east, and NOVUM (cassava flour) in the middle belt of Nigeria. From the preliminary discussions with the large scale agro-processors, it was clear that the major constraint faced is lack of sufficient fresh cassava roots to feed the factory. These agro-processors are currently operating below 30% of their installed capacity. They find it difficult to source for enough cassava to feed their factories; this is partly due to high demand for traditional food items and partly due to subsistence nature of farming with inherent low productivity. Therefore, the supply was made to be more cost-efficient by increasing cassava productivity, using clustering arrangement and linking farmers to service providers. This has produced good results in several cassava projects of the institute resulting in not least that 150% increase in productivity and commercial farming orientation. The role of IITA in the USAID-MARKETS Cassava Value Chain Project is to ensure that the farmers grow and manage these high yielding varieties very well to

supply the much needed raw materials to the industries. To achieve this objective requires a series of activities:

### Mobilization and clustering

This task commenced by selecting/identifying the large-scale industries (through visits and discussions) which will provide a market for cassava raw materials produced by small-scale farmers. EKHA, MATNA, and Nigerian Starch Mills (NSM) were recommended for participation in the USAID-MARKETS Cassava Value Chain Project. Several joint stakeholders' meetings were held by IITA and USAID-MARKETS with the agro-processors to discuss business plans and ascertain the suitability of the processing facilities. Following these were several formal and informal meetings between IITA and the large-scale agro-processors to further develop strategies for improving the supply of raw cassava materials to optimize the performance of their centers. Series of these workshops were held with farmers in project different locations of the agro-processors, with resource persons coming from USAID-MARKETS, IITA, Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), and First Bank. At the end of these workshops, farmers were clustered around each of the agro-processors. IITA currently adopts three farmers' clustering approaches: clustering farmers within their traditional settings with non-contiguous farms, clustering farmers on large expanses of communal or State-owned land outside traditional settings, and clustering of farmers on a large expanse of land owned and managed by farmers.

### Training programmes

The majority of farmers producing cassava depend on inherited knowledge mostly from parents or neighbours. Extension agents do not also update knowledge frequently and their efficiency is constrained by a farmer-extension agent ratio estimated at over 2000:1 in Nigeria. Therefore, improved practices for enhancing yield, though have been developed, remain on the shelf partly due to inefficient extension systems and less hunger for information by farmers. As a result, strategies for enhancing yields among small holder cassava farmers should address capacity building and training of farmers on competitive cassava production. It is against this background that IITA exposed more than 4000 farmers to various trainings ranging from pre-planting and pre-harvest agronomic practices, cost-efficient use of

herbicides, land clearing and soil fertility management and enterprise development. These trainings were also supported with series of demonstration event such as the use of mechanical, planter, brush cutter, stem handling techniques, and mechanical harvester.

#### **Demonstration trials/events**

For competitive and commercial cassava production, introduction and demonstration of the use of cost effective and time saving machineries for farming operations is important. This will not only replace or complement human labour with machines but it also ensures that farmers perform their farm operations within a short period of time. Most farmers do not have access to these machine, thus the project demonstrates its use and ensures linkages with such service providers.

The project is also highly responsive to emerging opportunities that enable the value chain to be efficient, for example establishment of demonstration plots for farmers' training. IITA established a total of 40 on-farms Demo Trials managed by selected farmers and closely supervised by IITA technicians to ensure that the recommended practices are followed. These practices included optimal plant spacing, cost-effective weed control practices, soil fertility management, mechanical harvesting and post harvest handling. The sizes of the demonstrations were between 0.5 and 1.0 ha, depending on the land available to the farmer. The trial was demonstrated such that half of the plot received farmers' practices while the other half demonstrated improved technologies. Data generated from demonstrations was used to validate existing crop budgets for cultivation under various technologies, e.g., with and without fertilizer application; herbicide application, selection versus non-selection of stems, etc. These On-farm demonstrations were used during field days and other training events to illustrate and discuss improved practices in an interactive way with farmers. IITA provided inputs, including cassava stems, fertilizers, CPPs, tractor and harvester needed for the demonstrations while partnering agro-processors/farmers provided tractors for land preparation.

#### **Development and distribution of extension guides**

To complement capacity building activities and demonstration events, IITA developed and distributed comprehensive extension materials targeted at improving knowledge and transferring

technologies to farmers. One advantage of the extension materials is that farmers could refer to them at anytime. 6 different technologies were transferred to farmers through extension publications on soil fertility management, stem handling techniques, weed management, harvesting and post-harvest handling, zero input technologies and cost-efficient mechanization practices.

#### **Linkages to service providers**

IITA facilitates linkages between the service providers such agro-dealers and mechanization providers especially the ones close to farmers and the farmers to ensure easy access to their services by the farmers. In the same vein, formation and training of commercial weed control business groups who can assist farmers with cost effective weed control practices are brought into the arrangement. Major input dealers provide agro-chemicals to the farmers at affordable prices, and loans from the financial institution are facilitated. These linkages led to the creation of new jobs to about 219 farmers. The incentive stimulated farmers to patronize the input dealers and this has led to the opening of village shops in the participating communities, thus making the inputs to be readily available and accessible to farmers. Various chemical companies have established close contact with farmers, willing to deliver their inputs to farmers on time. The price has also become competitive and farmers now have choice to make.

#### **Distribution of germplasm**

Yield gaps in cassava production can be bridged using high yielding and multiple pest resistant varieties developed by IITA in addition to improved agronomic practices that combine cost-efficiency and environmental friendliness (Nweke, 2002). However, access to these planting materials by farmers has been constrained over the years by low multiplication ratio and weak extension systems (Tarawali et al, 2008). IITA empowered farmers in this program through the multiplication and dissemination of improved high yielding varieties to farmers in the project locations. Each farmer mobilized and clustered around the large scale agro-processors received 60 bundles of improved planting material, which was adequate enough to plant 1ha.

#### **Monitoring and evaluation**

The institute has in place a monitoring and evaluation system that follows up the project

activities to ensure that all the stakeholders particularly the farmers are properly carried along and facilitate proper linkages and extension services. The system also guarantees timely collections, management, and reporting of valid and reliable data that meet donor reporting requirements

**Achievements**

This scheme which started in April 2009 has so far distributed cassava stems sufficient to plant more than 1000 ha to more than 1000 farmers, established 40 DEMOs in strategic locations, trained over 4000 farmers in different competitive cassava production techniques (including demonstration events on the mechanical planters, sprayers, stem and brush cutters), linked farmers to services providers such as agro-dealers and mechanization service providers and developed and distributed to farmers, six extension publications on competitive cassava production. A total of 8 production technologies associated with land clearing, soil fertility management, stem handlings, weed management, spacing, herbicides application, fertilizer application, and harvesting and post-harvest handlings. In addition to these, 22 weed control groups were established resulting to job creation for 219 farmers. The program has successfully increased yield from the baseline figure of 13.56 ha to an average yield of 35 ha (about 158% increases in yield) in the 2009/2010 planting season. These capacity building efforts will not only encourage cassava productivity at the farm level for the industries (producing mainly glucose syrup and starch) which at the moment are operating far below their optimum capacity but will also generate more income and jobs for the farmers. Following the successes of this program, the agro-processors demanded for additional 2700 ha (EKHA 2000 ha; MATNA 2000 ha; NSM 200 ha and NOVUM 200 ha), which is already being implemented for 2010 planting season. Summary of the achievements in this program is presented in table 1 below.

Table 1: Achievement in IITA-MARKETS cassava value chain project

Activity	Output
Number of direct farmers mobilized/networked for large scale industries	1085
Number of indirect farmers mobilized/networked for large scale industries	3000
Number of training conducted	4
Number of demonstration events	3
Number of farmers trained	4049
Number Demo Trials established	40
Area under improved management practices established	1304 ha
Number of farmers that received improved cassava cuttings	1304
Number of weed control business groups created	22
Number of jobs created as a result of weed control business groups	219
Number of extension publication developed	6
Number of farmers that received extension publications	>4000
Number of improved management practices made available to farmers	8
Number of farmers adopting new technologies or management practices as a result of project intervention	>4000
Number of people trained on private sector development training	291
Number of extension publication developed	6
Number of farmers that received extension publications	>4000
Number of improved management practices made available to farmers	8
Number of farmers adopting new technologies or management practices as a result of project intervention	>4000
Number of people trained on private sector development training	291
Change in productivity of cassava production	158%

**The past and present scenarios**

This cassava value chain development approach built on the efficiency of private-led businesses encouraged the best agronomic practices and guaranteed an effective and sustainable supply of raw materials to large scale industries (Figures 2 and 3).



Figure 2: Before IITA's intervention (2008)





Figure 3: After IITA's intervention (2010)

### Conclusion

The community value chain development approach has been proved as an effective model for making cassava agribusiness work in an evolving consumer preference driven system. The effective linkages and participation among major actors in the cassava agribusiness value chain have enhanced the reliability and efficiency of the input supply system, adoption of yield enhancing production technologies in productivity increase and better income for cassava farmers, and processors. According to the US Ambassador Robin Renee Sonder, during her recent visit to EKHA Agro factory, “*small-scale farmers will double their productivity and increase their net income by over 150 percent, thanks to better yield and higher prices*”.

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