IFAD- WEST AND CENTRAL AFRICA DIVISION









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**Mission Report for Visit to Ogun State Nigeria**

21st September – 1st October 2015

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# Executive Summary

During September 2015, a joint IPCI (NRI & FUNAAB) and VCDP team conducted a mission in Ogun State which had three main objectives as follows: (1) to make a rapid market and processing infrastructure assessment of several cassava-based SME and VPG processing organisations; (2) to prepare case-studies of one large-scale and one SME cassava processing industry to understand better the challenges faced by these businesses and to assess the potential for VCDP farmers in Ogun State to supply cassava to these businesses & (3)to establish contact with the national fabricators forum and several individual fabricators to discuss the concept of an e-based information platform to assist both fabricators and users of cassava processing equipment in Nigeria.

A checklist was developed and used for the assessment of the cassava processing VPG’s and SME’s. The SME’s visited revealed a raft of complex interrelated problems with business management, equipment, finance and marketing. MATSOL farms which is located within the coverage area of the VCDP showed potential to become a viable business with support. It is recommended that VCDP considers extending the provision for support to MATSOL and other similar SME’s by modifying the 2 tonne FCR per day limit for SME’s to 25 tonnes FCR per day. IPCI can assist VCDP in evaluation of SME sites and development of credible business plans for re-investment, we could also provide mentoring of SME’s that receive support under VCDP. If C:AVA2 can be linked into the VCDP/IPCI work it would be possible to provide more technical support to improve the efficiency of the businesses. The provision of soft-financing and technical support should be linked to successful development of a credible business plan for re-investment as in the experience of the IPCI partners not all of the Nigerian SME’s are suitable for support by VCDP.

The enthusiasm and dynamic potential of both of the VPG organisations visited were most encouraging and these groups need and merit support to implement better practices in primary production, to adopt better processing techniques and to improve business management and marketing. If VCDP can provide the financial support for the groups, IPCI can play a useful role in development of business plans and mentoring of groups that receive support from VCDP. A partnership with C:AVA2 is encouraged as this will facilitate access to markets and opportunities to benefit from training activities conducted under C:AVA2. IPCI can also play a key role in recommending appropriate and affordable processing technologies for the groups that will reduce costs of production and manage better the negative health and environmental impacts of current processing practices.

One of the case studies involved meetings with Allied and Atlantic Distillers (AADL) in Igbara and field visits to examine AADL’s smallholder driven cassava root supply system. AADL is a successful and expanding business that already processes 225-250 tonnes of fresh cassava roots per day on a year round basis. The company has developed strong relationships with over 4,000 farmers and is looking to expand procurement activities into new areas to meet demand for ethyl alcohol. There appears to be excellent potential to link VCDP farmers from the target LGA’s in Ogun State into AADL’s procurement system.

Discussions with several fabricators of agricultural processing machinery demonstrated interest in the proposed e-platform for fabricators. IPCI will continue to develop a pilot version or demonstration model and then liaise with VCDP and fabricators to start testing and development of the platform in Nigeria during 2016. The host organisation for the platform could be FUNAAB but this can remain open to be finalised by stakeholders during 2016.

At the end of the mission a meeting was held at the VCDP offices in Abeokuta, where VCDP and IPCI agreed on a range of inputs that IPCI could make in 2016-2017 (see conclusions and recommendations section). There is clearly much that IPCI can offer VCDP in Ogun State but resources are limited and have to spread over a much wider geographical coverage than Ogun State or even Nigeria. The priority for the IPCI partners active in Nigeria (NRI and FUNAAB) will be to examine their IPCI budgets closely and then work together to develop a joint action plan for 2016. This action plan will then be discussed and agreed with VCDP and IFAD so as to integrate the IPCI activities as closely as possible with the planned activities of VCDP. The action plan deriving from the outcomes of this report should be finalised by late April 2016, allowing supporting activities by IPCI for the VCDP in Ogun State to be initiated in May 2016 subject to approval by VCDP management.

FUNAAB and NRI are also senior partners in the C:AVA2 consortium and will look at the possibility for leverage of activities via closer partnerships between C:AVA2 and IPCI & VCDP.

# Introduction

This report provides details of the outcomes of the ‘Increasing Performance of the Cassava Industry in West and Central Africa Region’ (IPCI) project mission to work with the Value Chain Development Programme (VCDP) team in Ogun State, Nigeria during September 2015.

The purpose of this mission was to work in partnership with the VCDP team in Ogun State to initiate actions that would support the business case for commercial production, processing and marketing of cassava and cassava-based products. The overall aim of the IPCI team was to support the process of integration of VCDP activities with the private sector as the major drivers for development of effective and sustainable cassava-based industries. The mission follows recommendations approved by VCDP and IFAD (IPCI Periodic Report 1, 2015[[1]](#footnote-1); IPCI Mission to Nigeria project report, April 2015[[2]](#footnote-2)).

The IPCI team consisted of technical and business experts from both NRI and FUNAAB working closely with personnel from the VCDP team in Ogun State. Logistical support was shared equally between IPCI and VCDP. The Natural Resources Institute (NRI) is an international research and development institute with 120 years of experience of cassava production, processing and marketing and over 30 years of experience of the development of cassava in Nigeria. The Federal University for Agriculture in Abeokuta (FUNAAB) provides a centre for excellence on cassava research and extension in Ogun State arguably the most important state for cassava production and processing Nigeria. NRI and FUNAAB have been close partners for more than 20 years and are well placed to add value to the cassava-based activities of the VCDP in Ogun State.

Using the outline activities agreed in Abuja in April 2015, the IPCI team developed a draft Terms of Reference (TOR) for the mission which was agreed with the Ogun State VCDP team in advance of the mission (see Annex 2). In addition a simple checklist was developed for use in evaluating cassava businesses at all scales of operation ranging from village-processing groups, through SME’s to large-scale industries. Copies of the checklist were provided to all members of the field team. This checklist will be used as the basis for preparation of a more refined evaluation tool with additional information to provide the rationale behind the questions and analytical approach required when developing a business case for cassava-based industries. The development of the refined evaluation tool will be completed by end July 2016.

On 30th September, the team held a de-briefing at the offices of the VCDP in Ogun State. The IPCI team made a short presentation on the IPCI project and initial findings from the mission to Ogun State followed by a more detailed presentation of data collected during the mission and initial outcomes from the data analysis. This meeting enabled team members to make clarifications on the fieldwork and also to discuss the future direction of IPCI inputs to the VCDP project in Nigeria. The VCDP team were informed that NRI & FUNAAB management teams will have to discuss resource allocations in more detail before finalising plans for the coming year.

## 1.1 Outline of mission activities

The mission activities were divided into three parts:

**I. Rapid market and processing infrastructure assessment**

This activity involved the development and field testing of a rationale and tool for assessing small and medium enterprises (SME’s) and village processing groups (VPG’s) with the aim of building the business case for effective and sustainable interventions by the VCDP. As a subset of this activity the team explored the potential for VPG’s in the VCDP target Local Government Areas (LGA’s) to link with large-scale & SME processing businesses as suppliers of fresh cassava roots. As part of the assessment the IPCI team assembled a list of SME and VPG sites in Ogun State that were believed to be functional and of potential interest to VCDP. Visits were made to two VPG’s and two SME sites to test the assessment tool, one of the SME sites was included under activity 2 as a case study.

**II. Case studies of two cassava processing industries in Ogun State**

For this activity the IPCI team wished to look at two cassava processing industries with the aim of understanding current practices (both good and bad) and challenges faced by cassava processors in much greater depth. For the case studies we included one large-scale industry and one SME. The large-scale business selected for evaluation was Allied and Atlantic Distillers (AADL) who convert fresh cassava roots (FCR) into ethyl alcohol and Matsol Farms who process FCR into a range of cassava-based products. Although VCDP is not intended to provide direct support to large-scale investments there is still considerable scope to encourage large-scale businesses to include smallholder farmers in their raw material supply systems.

For the large-scale industry the team looked at the overall business and potential for expansion and then focussed in on the companies’ smallholder driven FCR procurement system and the potential for VCDP interventions to increase smallholder involvement and benefit from this value chain. In the case of the SME the team looked at the potential for direct support of the SME as well as smallholder farmers as part of the development of an integrated value-chain.

**III. Establish contact with equipment fabricators, national fabricators forum and identification of potential information platforms**

Nigeria has a diverse base of privately owned small to medium-scale fabricators of agro-processing equipment located mainly in the South West but with a few operators in the North, North Central and South East and South-South regions of the country. These fabricators have done much to develop appropriate solutions for SME processing of cassava and many other products.

However, many of the fabricators have limited technical capacity, equipment and financial resources. Designs are often ad-hoc with limited understanding of the underlying engineering principles, fabrication of machines is typically artisanal and bespoke with a complete lack of standardisation or reproducibility between units of product. Many fabricators offer little or no user training, spares, operating manuals or after-sales support. There is no common platform for users and potential users to access reliable information on Nigerian made machinery and limited cohesion between the individual fabricators.

The IPCI has started to investigate the potential for establishment of an electronic platform accessible from the internet and also via a smartphone application that would bring together Nigerian fabricators, encourage development of production standards and standardisation and provide users/potential users with reliable and independent information and an interactive platform for engaging with the fabricators. Some desk work is already underway at NRI to initiate development of a smartphone application that could be developed further in collaboration with stakeholders in Nigeria.

During the current mission the IPCI team arranged to meet with three fabricators (based in Lagos & Ogun State), namely Deban Faith Agro-Ventures (DFAV) of Abeokuta and Nobex Industries and Niji-Lukas Ltd of Lagos. DFAV was chosen as a typical example of the smaller fabricators, whereas Nobex and Niji-Lukas are the largest and most successful of Nigeria’s equipment fabricators. Niji-Lukas and DFAV are members of the Agricultural Machinery and Equipment Fabricators Association of Nigeria (AMEFAN), but Nobex Industries is not a member.

The team also had an opportunity to meet with representatives of AMEFAN. The Association is a private sector inspired body that may offer an easy route for engagement with fabricators for development of the proposed e-platform for information sharing.

Parts I, II, and III of the mission as described above, will be further discussed in sections 2, 3, and 4 respectively.

# Development of a method for rapid market and processing infrastructure assessment of SME’s and VPG’s

NRI and FUNAAB, in collaboration with VCDP in Ogun State, have developed and tested a method for rapid assessment of small and medium enterprises (SMEs) and village processing groups (VPGs) for cassava products such as HQCF, gari, fufu, and lafun. The aim of the assessment is three-fold:

1. **Analyse the business case for IPCI/VCDP investments in SMEs and VPGs.** Well-targeted VCDP support in cash (loans) or kind (technical support, training, establishing market linkages) can strengthen the assessed processors and help their business in a way the SME or VPG would not be able to achieve on their own, thereby contributing to a stronger cassava industry as a whole (see below). However these interventions can have an adverse effect if the business is not economically sustainable, particularly where loans would contribute only to further financial problems. The assessment aims to investigate whether or not support will be beneficial for the SME/processing group, and have positive spill-over effects to other cassava value chain actors.
2. **Identify specific opportunities to support SMEs and processing groups in sustaining their business in an economically viable manner.** This will not only directly benefit the SME and/or group, but is also expected to have positive indirect effects, via forward and backward linkages, on producers (farmers) and other value chain actors. The assessment will identify what particular strengths can be built upon, what opportunities should be captured to grow the business, and which weaknesses will need to be addressed. This includes enhancing processing efficiency, reducing costs, improving management, strengthening the supply of raw materials, capturing market opportunities, and understanding which activities are not sustainable.
3. **Understand the general current state of affairs for the small and medium scale cassava processing industry.** The assessment of various individual SMEs and processing groups will give insights into general challenges for the small and medium scale cassava processing industry that may need further strategic support (e.g. policy/enabling environment, infrastructure, market segments development, sourcing of raw materials, etc).

## Content of the assessment

The assessment takes into consideration a range of components which are summarised below. Annex 1 provides the full checklist with sub questions.

Note that although the checklist is to a large extent applicable to both SMEs and VPGs, not all questions may be equally relevant to both. In some cases, in particular the groups may find it difficult to answer in certain set units (e.g. kg per day, tonnes per month), but in this case try to find a unit of measurement that the group is familiar with (how long does it take to process one (….) tonne truck of roots; how many (….) kg baskets, or 50 kg bags of gari does it result in, etc) and subsequently convert these units.

The questions can be altered to better fit the particular context of the SME or VPG that is interviewed. In some cases, it could be advised to focus on particular parts of the checklist if there is no need to obtain all details of the bigger picture, or if time is a limiting factor.

1. **Overview of the business**

This section starts with recording general information such as the name and contact details of the business and owner, location, and start date/year of operations.

It also looks at what products are currently produced, and how this relates to past production and future plans. This is to establish whether there have been any challenges or change of direction, and how the business has evolved since operations began. The questions under the heading ‘capacity’ ask about the processing and production capacity: what is the potential production capacity, and how much is produced in reality.

The last questions in this section ask about the market, for example: to whom are products sold and at what price; have there been any trends or changes over the last months / years; what is the nature of the sales arrangements (spot, contract, etc); what costs are involved with marketing; does the business have a marketing strategy or plans for further market development, etcetera?

The answers provided in section I should already give an indication of the status (‘health’) of the business, and some of the challenges.

1. **Processing and production**

This section examines the production process in greater detail. It asks to discuss and draw a process flow chart, to ensure that follow-up questions address all components, and to avoid assumptions about a certain process that may differ from the one actually implemented by the SME or VPG.

For most cassava processing businesses, fresh cassava roots (FCR), the raw materials, are the major component of their direct costs (operational costs): ca 50-60%, or more. At the same time, many businesses struggle to secure a reliable supply of good quality roots. For this reason, this section aims to fully understand the relationship with FCR suppliers and availability of roots. FCR price trends, any challenges related to sourcing raw material, and any other costs involved at this stage.

The next step looks at water and power supply: what are the sources, how reliable are they, and what are the related costs?

The questions on processing and equipment are meant to provide a detailed insight into the production process and costs. It collects technical and economic information related to all of the production steps, from peeling and grating down to drying/frying and bagging. Details on equipment (if being used), include:

1. Make (name fabricator) and model
2. Processing capacity (e.g. in kg per hour –note whether this is input or output)
3. Power consumption (e.g. in kWh, HP, or other units).

This information will enable the assessor to obtain an idea of the efficiency of the equipment, calculate costs involved, and estimate the theoretical processing capacity of the SME/VPG (please note that this may differentiate from the actual processing capacity). If the aim of the assessment is to obtain a thorough understanding of the processing efficiency, for example with the objective of making recommendations for efficiency improvements, it is advised to obtain data on moisture content before and after each processing step. This is particularly relevant when mechanical dryers such as flash dryers are used. In this event it is important that the cassava grid (wet mash) is as dry as possible before it enters the dryer, in order to save fuel (and thereby reduce costs) during the mechanical drying process.

A detailed breakdown of processing steps will also provide an opportunity to understand the extent of losses and/or waste during each of these steps.

Finally, the last question under section II aims to set out the capital investment: what have been the costs of the processing equipment mentioned, the building(s), the land, tanks, boreholes, etc? This information is required to calculate depreciation costs. This last question also asks whether there are any issues with the infrastructure that could impact on the business, and aims to obtain information about the ownership of the site, including land.

1. **Management and labour**

Section III: management and labour, aims to provide further understanding about the labour requirements and arrangements, as well as management structures and capacity. It assesses how many people work for the SME/VPG, whether these are hired labourers or family labour, casual labourers or permanent staff. It provides information on the cost of labour, and payment arrangements, e.g. per month, day, hour, or per delivered unit of output (for example ton of roots peeled).

The questions on management not only ask about who is in charge of operations, but moreover aim to give an understanding of how well the SME/VPG is managed. What are the responsibilities of the manager, is there a business plan or other kind of operational strategy that is being followed, does the manager/owner have a clear idea about incomes and expenditure?

Important is the section on quality and quality control: are there any standards for processing and/or for the quality of the final product that the SME/VPG has to comply with? What are the quality assurance mechanisms in place, if any?

1. **Enabling environment for business**

Under this general heading fall a range of topics and questions that will help to understand the business environment for the SME/VPG. It addresses issues that could impact on the ease of doing business, such as difficulties with registration or obtaining finance at a reasonable interest rate. It also looks at whether the business is a member of any network or association, and what the perceived benefits (or shortcomings) are of this membership. Other institutional factors that are being considered, are: access to market information (to make timely and informed market decisions), policy decisions and regulations, infrastructure, and risks threatening business development –as well as the ability to manage these.

As a final question for this section, and the very final question for SMEs, the respondents are being asked about their plans for future development: how do they envision the future of their business, are there particular challenges that need to be addressed, or opportunities that can be captured? This question also gives room to the respondent to add, or highlight any issue that is of particular importance and may not have been brought up in the discussion so far.

1. **Governance of processing groups (VPGs)**

This section applies only to producer/processing groups (VPGs), and has the objective to assess whether there are any issues in the way the group is governed: how is the board elected, do members feel they are adequately represented by the board and do they perceive clear benefits from their membership of the group? Finally, are there structures in place to resolve any disagreements?

## Rapid market and processing infrastructure assessment: testing of the method, and understanding challenges for SMEs and VPGs

In order to further develop the method for assessment of small and medium enterprises (SMEs) and village processing groups (VPGs), the NRI/FUNAAB team in collaboration with VCDP interviewed two VPGs and one SME , thereby using (components of) the checklist. The full checklist can be found in Annex 1 of this report. The three assessed organisations were: :

1. Blopamed Industries in Ijebu East (SME);
2. Agbelere Farmers and Processors Association in Bara (VPG);
3. Alapako Community Association in Irewolede (VPG).

The VCDP team in Ogun state expressed their intention to use the Agbelere Association as a case study for other processing clusters. VCDP was thereby particularly interested in applying the IPCI rapid assessment to understand the economic aspects and cost-effectiveness of the gari processing group; the discussion with the Agbelere stakeholders as a result focussed mostly on this topic.

The assessment of the Alapako Association too concentrated to a large extent on the economics of processing cassava into gari, but in addition took into account the costs of producing fresh cassava roots. Another aspect that was intensively discussed with the Alapako group were marketing challenges for the gari processors.

The discussions with Blopamed focused predominantly on understanding challenges for business development. Blopamed was not analysed to the same extent as the two VPGs, but the discussion was used for further development of the method of assessment.

### Blopamed Industries (SME) in Ijebu East LGA

BLOPAMED is a long established cassava processing SME located in Ijebu East which is outside the VCDP target area but in close proximity to one of the LGA’s selected for support under the VCDP. Based on knowledge of past performance of BLOPAMED it was thought that there could be potential for VCDP farmers to become contract growers for BLOPAMED. BLOPAMED has 6 improved pattern gari fryers and one mechanised gari fryer with a total capacity of ~4 tonnes per day of gari. The company also has an upgraded and functional peak products single cyclone flash dryer with Nobex heat exchanger (capacity 1 tonne per day) and a non-functional Basicon single cyclone flash dryer. The flash dryer can be used for production of instant fufu powder and HQCF with an annual capacity of 300tonnes of dry product. BLOPAMED also have a farm with land with 70ha of cassava, 7ha of maize and a small catfish farm.

BLOPAMED produce high quality Ijebu-gari and instant fufu in 1kg retail packs. The quality of the products is very good and five years ago they were selling 240 tonnes of fufu and >100 tonnes of gari per year. At this time 100 people were employed by the business and cassava was sourced from their own farm and smallholders close to the factory. However, by the time of the IPCI visit in September 2015 the business had fallen on hard times. Only one person is employed fulltime now with 5-6 casual labours bought in when needed. On the day of the visit one woman was making gari and another member of staff was preparing instant fufu powder. Sales of instant fufu have fallen to around 5 tonnes per year. Gari sales are down to 5 tonnes per annum and lafun is 6 tonnes per year. HQCF is not made as there is no market for the product. BLOPAMED have also diversified into production of Ogi a maize based product in 2014 they sold 10 tonnes of Ogi. BLOPAMED product pricings were uncompetitive (~50% higher than other suppliers) and the business has limited understanding of the retail market for gari and fufu in Nigeria and no sales or marketing strategy or personnel. Product costs were unclear but there were not including the cost of cassava roots as part of production costs which indicates a very unrealistic view of their business. The SME was further hampered by an unwise decision to take a BOI soft loan at 12% APR to purchase a Basicon flash dryer in 2014. This dryer has never worked and sadly is never likely to work due to poor design and appalling build quality but the loan must still be repaid.

BLOPAMED production levels are very limited and the company lacks the necessary working capital to pay farmers for cassava roots. There appears to be no potential for VCDP to link with BLOPAMED as a buyer of roots. The company has serious issues with business management that would have to be overcome before the business could be revived.

### Agbelere Farmers and Processors Association, Bara

Although ‘Agbelere’ means ‘profitable farming’, the Association focuses on not only efficient and economically viable farming practises, but also cassava processing and marketing.

The respondents in the interview included the Chairman and ca. 16 members of the group (10 women, 6 men). The Association consists in total of about 60 members, and concentrates on the production (ca 30 members, predominantly men) and processing (ca 30 members, predominantly women) of cassava. Some other vegetables are cultivated as well (e.g. maize), but the main business of the group is cassava.

The group produces gari, flour, and fufu (in order of importance). Gari is by far the most important product in terms of volume processed and sales, but the processors indicate that markets are saturated, prices are low, and it is a challenge to find buyers. This was a recurring topic in the discussion.

#### 3.2.2.1 Gari production

Each of the 30 processing members take 8-9 days to produce 600 kg gari from 2,500 kg of fresh cassava roots (FCRs), which indicates a conversion ratio of

4.17 : 1, a seemingly efficient ratio for gari processing. Per month, individual group members can process a maximum of 10 tonne FCR, which means that the group has a maximum processing capacity of 300 tonne FCR (or 72 t of gari).

Table 1 sets out the processing cost for gari as they emerged from the discussion with the producers and processors.

**Table 1: Cost of processing gari at Agbelere Farmers and Processors Association (Bara)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Cost per 2.5 t truck FCR (N) | Cost per t FCR (N) | Cost per t gari (N) | % of Total costs (excl marketing) |
| Fresh Cassava Roots + Transport | 16,000 | 6,400 | 26,667 | 61.3 |
| Peeling | 2,500 | 1,000 | 4,167 | 9.6 |
| Washing | 700 | 280 | 1,167 | 2.7 |
| Grating | 1,500 | 600 | 2,500 | 5.7 |
| Pressing | 600 | 240 | 1,000 | 2.3 |
| Pulverising / Grating | 600 | 240 | 1,000 | 2.3 |
| Frying | 3,600 | 1,440 | 6,000 | 13.8 |
| Packaging | 600 | 240 | 1,000 | 2.3 |
| Total | 26,100 | 10,440 | 43,500 | 100 |

These are the gari production costs excluding transport to the market and other marketing costs. The last column in the table shows that with more than 61%, buying fresh cassava roots takes up the lion share of the total production costs. This is at some distance followed by frying (13.8%), which is mostly due to the cost of fuel wood, and peeling (9.6%), which is due to the labour-intensive nature of this task.

The group sell their produce mainly at two markets: Siun at 3 km distance from the processing centre, and Sagamu at 5 km distance. Selling prices were said to fluctuate between N3,000 and N4,500 per 100 kg bag of gari (i.e. N30,000/tonne and N45,000/tonne). The respective profit margins, taking into account the transport costs to either market, are calculated in table 2 below.

**Table 2: Gross margin in Naira, for average high and low market prices**

|  |  |  |
| --- | --- | --- |
|  | Market price 4,500 N/100kg gari | Market price 3,000 N/100 kg gari |
|  | Siun market  | Sagamu market  | Siun market  | Sagamu market  |
| Production cost per 100 kg bag | 4,350 | 4,350 | 4,350 | 4,350 |
| Transport to market | 100 | 150 | 100 | 150 |
| Total costs  | 4,450 | 4,500 | 4,450 | 4,500 |
| Revenue (selling price)  | 4,500 | 4,500 | 3,000 | 3,000 |
| Margin per 100 kg bag  | 50 | 0 | -1,450 | -1,500 |
| Margin per t gari  | 500 | 0 | -14,500 | -15,000 |

It is clear that in this scenario, even with the higher average market price of 4,500 N/bag of gari the group is just about breaking even; profits are negligible. In the case of a lower market price of 3,000 N/bag of gari, the processors are making a substantial loss.

**Table 3: Gross margin in Naira, for average high and low market prices, without cost of FCR**

|  |  |  |
| --- | --- | --- |
|  | **Market price 4,500 N/bag gari** | **Market price 3,000 N/bag gari**  |
|  | Siun market | Sagamu market | Siun market | Sagamu market |
| Production cost per 100 kg bag | 1,683 | 1,683 | 1,683 | 1,683 |
| Transport to market | 100 | 150 | 100 | 150 |
| Total costs  | 1,783 | 1,833 | 1,783 | 1,833 |
| Revenue (selling price)  | 4,500 | 4,500 | 3,000 | 3,000 |
| Margin per 100 kg bag  | 2,717 | 2,667 | 1,217 | 1,167 |
| Margin per t gari  | 27,170 | 26,670 | 12,170 | 11,670 |

In the discussions with the processors it was largely unclear whether the members pay for the roots they process, or whether these roots are considered ‘free’, particularly when they are produced within the same household (e.g. husband cultivates roots, wife does processing). The costs of the roots as quoted in table 1 were derived from general selling prices stated by the farmers. If root prices and transport to the processing site would not be taken into account, the margins naturally become substantially higher:

Although in this case it may look like the processors are making a profit, for the household as a whole (if roots are supplied by spouse) this will not be the case. The costs of root production have to be taken into account when calculating the total production price and subsequently the profit margin. So in fact, this margin is a return to labour, land and any other recurrent costs such as inputs.

#### 3.2.2.2 Break-even point at both market prices

In the case study of the Agbelere Association, if all data provided is correct (and correctly interpreted), with market prices of N3,000/100 kg (N30,000/tonne) the processing group would break even if the root prices are a maximum of N 2,800/tonne. This price is far too low for cassava farmers to make any profit. With market prices of N4,500/100 kg (N45,000/tonne), processors are breaking even at the current root price (plus transport cost) of N6,400.

#### 3.2.2.3 Improving processing efficiency and increasing margins

Compared to the Alapako Association (see next section) and to other known gari processing groups, the Agbelere Association seems to be particularly efficient in their processing. There appear to be very few losses during the various processing steps. It is therefore unlikely that much financial saving can be gained by improving, for example, peeling practices (see p.22). The costs of frying gari however are relatively high. One of the ways of increasing the profit margin for the Agbelere processing group could therefore be to support more efficient frying and invest in a simple but efficient way to reduce the consumption of fuel wood. This modification in the production process is also recommended for another reason: it appeared during the visit that the frying of gari currently produces large amounts of smoke which is inhaled by the workers. To improve the working conditions and reduce the negative health impact of frying, it is advised that VCDP would support a more efficient frying method that includes adequate ventilation. Discussions with fabricators of cassava processing equipment have shown that this is possible and already implemented in some gari-processing facilities[[3]](#footnote-3).

Another opportunity to improve profit margins for the Agbelere processors would be first of all to understand why current market prices are low, at N 30,000 to 45,000 per tonne of gari. If this is a normal seasonal or even (bi-)annual fluctuation, the current lower prices and profit margins (or even losses) may be counterbalanced by higher prices in the future. However, the price of N30,000 seems particularly low, especially compared to the price of approximately N42,800 which was said to be the current market price for the Alapako Association (and also perceived to be very low). It is advised that further research is undertaken by the IPCI/VCDP team to understand whether the low prices are the result of:

1. Normal seasonal/annual price fluctuations (which are likely to be balanced by low root prices which also reduce the processing costs compared to years where gari and root prices are high);
2. Generally saturated markets;
3. Weak bargaining power of the Agbelere processors on the market;
4. Limited access to higher-paying markets for the Agbelere processors;
5. Insufficient market information about higher-value markets;
6. Quality issues of the produced gari.

Although it is most likely that the VPG is a price-taker and not a price-setter on the market and has little influence on regional market prices, it could be explored whether the group can differentiate themselves, thereby aiming for higher prices, by ensuring high quality gari and marketing it under a brand (e.g. through simple and cost-efficient packaging). This might be challenging however since most gari buyers normally would like to sample the product and feel the texture/moisture content before purchase. In addition, it would further increase the costs and is therefore not likely to be economically viable.

#### 3.2.2.4 Other challenges for the Agbelere Farmers and Processors Association in Bara

During the discussion with the producers and processors a number of additional challenges were flagged up by the group. These include:

1. There is inadequate availability of and access to equipment for agricultural mechanisation;
2. There is insufficient access to (affordable) agricultural inputs such as fertilisers and pesticides;
3. Farmers face substantial marketing challenges for roots. Prices are low, markets seem saturated. The option of providing roots to AADL was discussed, but the viability of this will depend on the conditions of sales and the additional transport costs
4. Inadequate road infrastructure is hindering access to and from the farms. Many fields are 2-3 km away and are currently mainly accessed on foot, which limits transporting the heavy roots from point of production to point of sale/processing.
5. The gari processors feel they would benefit from better processing infrastructure such as a borehole for water supply, and a shed for storage.
6. Both the producer and processing group could benefit from the business plan that is under development by VCDP. It is recommended that the plan will consider marketing challenges and opportunities, as well as financial aspects.

### Alapako producer and processor Association, Irewolede

The Alapako association is well known to VCDP as it has been supported under the previous agricultural development programmes Fedema 2 and Fedema 3. The NRI-FUNAAB-VCDP team met the Chairman plus an additional 21 members (6 women, 15 men). The association comprises 15 producer groups (8 of which are registered), and 7 processor groups (2 of which are registered). Each group consists of 12 to 25 members, whereby 25 is the maximum number of members in one group as stipulated by VCDP. The respondents in the interview belong to a range of these producer and processor groups.

#### 2.2.3.1 Cassava production

All producers farm on at least one acre per person, with some farmers having more than three acres. The discussions with the farmers led to the following calculations of costs:

**Table 4: Cost of cassava production Alapako Association**

|  |  |  |
| --- | --- | --- |
| Cost of land and labour(excluding agricultural inputs as these are mostly not used) | cost per acre (N) | cost per ha (N) |
| Land lease  |  |  | 4,000 | 10,000 |
| Labour | man-days per acre | cost/man-day (N) |  |  |
|  Clearing land | 6 |  600 | 3,600 | 9,000 |
|  Fertiliser application (not done) |  |  | - | - |
|  Burning  | 1 |  600 | 600 | 1,500 |
|  Packing  | 2 |  600 | 1,200 |  3,000 |
|  Making ridges  | 15 |  600 | 9,000 | 22,500 |
|  Planting  | 2 |  600 | 1,200 | 3,000 |
|  Weeding 1 | 6 |  600 | 3,600 | 9,000 |
|  Weeding 2 | 6 |  600 | 3,600 | 9,000 |
|  Weeding 3 | 6 |  600 | 3,600 | 9,000 |
|  Spraying (not done)  |  |  | - | - |
|  (Harvesting\* | 2 |  6,000 | 12,000 | 30,000) |
| Subtotal labour | 44 |  | 26,400 | 66,000 |
| Total costs |  |  | 30,400 | 76,000 |

\*harvesting is normally done by the buyer, and the cost of harvesting are not directly borne by the farmer but by the buyer. The harvesting costs are reflected in the root price offered to the farmer.

The cost of labour, in this case of ‘organic’ agriculture without the use of inputs, is the most important contributor to total cost cassava production. Labour costs were said to vary between N 500 and 700 per day. If we would take 700 instead of 600, the total cost of production would increase to N 87,000/ha[[4]](#footnote-4).

The average yield per acre is 8 tonne, i.e. 20 t/ha[[5]](#footnote-5). Following table 4, this would imply that the production cost per tonne of roots is N3,800. Each acre on average fills 2 trucks (‘capstars’) with a loading capacity of 4 tonne each. The farmers are being paid N25,000 per capstar at current prices. The costs for loading the capstars (N 4,000 per truck) is, like harvesting, paid for by the buyer.

This results in the following gross margin (see table 5):

**Table 5. Gross margin cassava production (N) with a yield of 20 tonne/ha (no inputs used)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Per hectare | Per tonne FCR | Per Capstar |
| Production cost | 76,000 | 3,800 | 15,200 |
| Selling price FCR | 125,000 | 6,250 | 25,000 |
| Margin  | 49,000 | 2,450 | 9,800 |

It seems that in this case, even with the relatively low root prices on the market, the farmers are able to make a profit.

Very few members of the Association apply fertiliser and pesticides – in the group of respondents only the Chairman and one other member use chemicals. Planting materials are normally the farmers’ own, only when a new variety is introduced will farmers pay for these. The cost of these inputs are as follows:

**Table 6. Cost of agricultural inputs (mostly not used)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | # units / acre | cost per unit (N)  | cost per acre (N) | cost per ha (N) |
| Planting material  | 40 | 250 | 10,000 | 25,000 |
| Fertiliser | 0.8 |  | 4,400 | 11,000 |
| Pesticides 3 applications of 4 litres each | 12 | 1,150 | 13,800 | 34,500 |
| Input costs subtotal  |  |  |  | 70,500 |
| Labour and land subtotal (excluding costs of manual weeding) |  |  |  | 49,000 |
| Total costs  |  |  |  | 119,500 |

If agricultural inputs are used (fertiliser and pesticides), the yield was said to be 12 tonne per acre (i.e. 30 tonne/ha)[[6]](#footnote-6). This would lead to the gross margins presented in table 7.

**Table 7. Gross margin cassava production with a yield of 30 tonne/ha (fertiliser and pesticides applied)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Per hectare (N)** | **Per tonne FCR (N)** | **Per Capstar (N)** |
| Production cost incl planting material  | 119,500 | 3,983 | 15,932 |
| Production costs excl planting material  | 94,500 | 3,150 | 12,600 |
| Selling price FCR | 187,500 | 6,250 | 25,000 |
| Margin (incl cost planting material) | 68,000 | 2,267 | 9,068 |
| Margin (excl cost planting material) | 93,000 | 3,100 | 12,400 |

The calculations in table 7 suggest that, if fertilisers and pesticides are applied, margins increase by about a quarter (26%) per tonne FCR. However this figure is likely to be lower in reality, since the yield this is based on (30 tonne/ha) seems very high. In addition, it is likely that there will be some costs for manual weeding in addition to the application of fertiliser. If plant materials are taken into account in this equation, the margin is about the same as ‘organic’ production without the cost of planting materials. For the vast majority of producers in the association however, tables 6 and 7 are irrelevant since they do not apply inputs.

#### 3.2.3.2 Challenges for cassava producers

A number of issues were raised by the farmers interviewed when discussing their business. Most importantly, farmers currently struggle to find markets for their produce. An abundance of cassava roots in the region means that demand, and prices, are low. Farmers have tried to link with industrial buyers, in particular Thai Farms, but the high cost of transport (vehicle costs plus ‘roadblocks’) means this is not a viable option.

At present starch levels in the roots are relatively low due to seasonal variability, and this provides a further barrier to supply industrial users of cassava (who typically pay per starch content). The option of linking with AADL was discussed, but because farmers will also have to bear the costs of transportation to this buyer, the cost implications of this will have to be well understood. If linking with AADL would be economically viable, it is advised to verify whether the roots grown by the farmers are the most suitable for supply to the ethanol producer. Ethanol producers will always look for maximum starch content and minimum levels of free moisture, fibrous or woody material. Typically this means growing high dry matter varieties such as TMS419 and harvesting at 10-12 months when starch levels peak but before too much fibrous or woody material is laid down.

Producers mentioned lack of affordable credit and finance as a further limitation to business development. Finally, cassava production at the Alapako association relies heavily on manual labour, which is normally hired. Any increase in the price of labour has a direct effect on production costs and profit margins. Mechanisation would be desired, but this appears not feasible because of the high number of trees on most plots. The option of small scale mechanisation that has the ability to work around the trees, could be further explored within IPCI.

#### 3.2.3.3 Gari production

The representatives of the Alapako processing groups gave insights into the costs of gari production. Gari is the single most important product for the group. Other cassava based products are fufu cassava flour and HQCF, but this is expensive to produce and difficult to sell due to low market demand. The processing women diversify by selling vegetables as well, but the main source of income –normally- is gari. The processors emphasised however that with current market prices, gari production is not profitable.

As with the Bara group, the processors here are predominantly women. The women provided details of the processing costs per 400 kg basket of FCR, which is converted to 70 kg of gari. Note that this conversion ratio is 5.71 : 1, which seems inefficient compared to average gari processing conversion figures in the region. Although the conversion factor will vary depending on the variety of cassava, its starch and fibre content, and the processing technology used, the average ratio is about 25%, i.e. 4 : 1, and rarely more than 4.5 : 1 (e.g. Guilleminault D., et al, 2014[[7]](#footnote-7)). Table 8 below has translated these figures into cost per tonne FCR and tonne gari.

The gari processors take their products to the market in 50 kg bags. At the market, this is poured into plastic bowls containing 35 kg of gari each. Due to the existing marketing arrangements and strong middlemen associations, the processors cannot sell the gari to the end consumers themselves, instead they sell their produce to traders who subsequently sell to final consumers. Table 8 shows the cost of gari production and marketing.

**Table 8. Cost of gari production and marketing**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Cost per 400 kg FCR (N) | Cost per t FCR (N) | Cost per t gari (N) | Notes | % of Total costs (excl marketing) |
| Production costs |  |  |  |  |  |
| Fresh Cassava Roots  | 2,300 | 5,750 | 32,857 |  | 60.5 |
| Peeling | 200 | 500 | 2,857 |  | 5.3 |
| Washing | 0 |  |  | There is no charge for water use | 0 |
| Grating | 600 | 1,500 | 8,571 |  | 15.8 |
| Pressing | 200 | 500 | 2,857 | Free for members | 5.3 |
| Pulverising / grating | 200 | 500 | 2,857 | Free for members | 5.3 |
| Frying | 700 | 1,750 | 10,000 |  | 18.4 |
| Packaging | 0 |  |  | Bags are paid for by buyer and recycled | 0 |
| Subtotal | 4,200 | 10,500 | 60,000 |  | 110.6 |
| Member discount  |  |  | -5,714 |  | -10.6 |
| Total production cost |  |  | 54,286 |  | 100 |
| Marketing costs  |  | Cost per 50 kg bag (N) | Cost per t gari | Notes |  |
| Transport |  | 100 | 2,000 |  |  |
| Tax |  | 50 | 1,000 |  |  |
| Commission trader  |  | 143 | 2,857 | The ‘commission’ taken by the trader is a bowl of gari (N 100 per 35 kg) |  |
| Total marketing costs |  |  | 5,857 |  |  |
| Total costs production and marketing  |  |  | 60,143 |  |  |

At the time of the interview with the Alapako group (September 2015), the gari market was flooded, which translated into low prices. A 35 kg container of gari sold for N1,500, with members stating that two years ago this price had been N2,500, and N4,000 five years back. Table 9 shows gross margins for these three selling prices, although it has to be taken into account that when gari market prices are high(er), the price of roots are likely to have been higher as well, and therefore the difference in margin may have actually been lower than depicted in the table.

 **Table 9. Gross margins for gari processors**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Current market prices (Sept 2015) | Slightly higher scenario | Market price in 2013 |
| Selling price per 35 kg container (N) | 1,500 | 2,000 | 2,500 |
| Selling price per t gari (N)  | 42,857 | 57,143 | 71,429 |
| Production cost per t gari (N) | 60,143 | 60,143 | 60,143 |
| Gross margin per t gari (N) | -17,286 | -3,000 | 11,286 |

#### 3.2.3.4 Marketing challenges

The processors underlined that marketing is a serious challenge. First of all transport to the market is relatively expensive at N100 per 50 kg bag, plus another N50 per person. At the market there is a selling ‘tax’ of N50 per bag. However, the biggest frustration for the processors was their inability to sell directly to end consumers. The processors are forced to sell their produce to middlemen, who buy at N1,500 per 35 kg (thereby taking N100 as commissioning). The middlemen then sell this 35 kg for approximately N2,800-2,900[[8]](#footnote-8). The processors feel that if they were able to directly sell to end consumers themselves, they would be able take home this difference and be able to make a profit.

The processors therefore expressed a keen interest to open a shop or store in town, which would enable them to do this. At periodic markets it would not be possible to open a shop, as the strong and influential middlemen associations would not enable the processors to have a store there.

#### 3.2.3.5 Break-even market price at current production costs

Assuming production costs of N60,143 (including marketing costs) for members of the Alapako group, the women would break even if market prices are N2,105 per 35kg container of gari (N 60,143/t). They would only make a profit if prices surpass this threshold.

The interviews with the Alapako group and other stakeholders in the cassava market provided insufficient information to fully understand whether the current low prices of gari and FCR are a seasonal fluctuation which may go up again during this year or within a couple of years, or whether this is a continuous downward price trend that is unlikely to go up again soon. However conversations with some cassava value chain experts at FUNAAB suggested that price fluctuations are common, and prices are expected to rise again over the next years. This, of course, will also be influenced by the volume of FCR on the market: if cassava production will continuously increase in the region over the next years, this will likely be reflected in low market prices

#### 3.2.3.6 Break-even production costs at current market prices

Assuming a given market price of N1,500 per 35 kg of gari (N42,857/t), production costs, including marketing, would need to lower to N42,857/t in order to break even. Marketing costs in the case study of the Alapako group are relatively fixed at N 5,857/t, meaning that the processors can do little to lower these costs unless they would be able to access more profitable and less expensive market outlets. To avoid losses at current market prices, production costs would therefore need to lower to 42,857 - 5,857 = N37,000/t gari. This reduction could only be achieved through either lower purchasing prices of fresh cassava roots, which make up the vast majority of production costs (ca. 55% of total production costs for members, and 50% for non-members), or through more efficient processing.

The fresh cassava roots (FCR) are currently bought at N2,300 per 400 kg basket, i.e. N5,750 per tonne. This is a relatively low price, compared to, for example, current FCR prices quoted at the Agbelere group (N6,400/t, incl transport to processing ground) and compared to average market prices. In recent years, cassava prices have been known to surpass even N12,000 - N15,000/t in times of root scarcity, which is a further indication that at present root prices are comparatively low. It is unlikely that negotiating lower cassava root prices with farmers would benefit the processors in the long run. In addition, it would have a negative effect on incomes and livelihoods of the cassava farmers. The most effective way to increase profit margins therefore would be to try and improve the conversion ratio of roots to gari.

#### 3.2.3.7 Improving processing efficiency

The processors stated that a 400 kg basket of roots will provide 70 kg of gari. This is a conversion ratio of 5.71:1. This ratio seems inefficient, indicating that unnecessary losses may occur. In comparison, the Agbelere processing group in Bara quoted a conversion ratio of 4.16:1 –which seems extremely efficient and may be difficult to achieve, but shows that there is room for substantial gains. If the Agbelere group would process at a similar conversion ratio (4.16:1), production costs would be lowered to N 39,520 for members, and N 43,680 for non-members (excl marketing costs of 5,857). While their total costs would still be higher than the current gari market price of N42,857 N/t, the gap is significantly smaller. Since the gari processors would still make a small loss, it is imperative to understand whether current prices are a seasonal low that will be balanced by higher prices at other times in the year (or few years). If this is the case, overall gari processing may be profitable in the long run despite a loss at current prices. This profitability may be further increased by improving efficiency.

One of the ways to make gari processing more efficient, could be to improve peeling. Research by Graffham (2010) shows that expected peeled root yield should be about 82% (likely range of 80-84%). If the yield is 82%, this implies that 1000kg of roots will yield 820kg of peeled roots and 180kg of peels. Yields outside this range indicate either inadequate peeling or over-peeling with unnecessary removal of the white starch containing flesh. The peeling rate is dependent on the skill of the worker and the type of knife used. In India for example, workers with a potato peeler type knife ranged from 126-224 kg of unpeeled roots /hour (mean 179kg unpeeled roots /hr). In Ghana workers with straight (~30cm blade) knives ranged from 21-50kg per hour (mean 41kg of unpeeled roots per hour). In Nigeria workers with the same type of knife achieved mean rates of 100kg unpeeled roots /hr and peeled root yields ranging from 69 to 73% (Graffham, 2010).

Further research is advised to identify whether workers in the Alapako processing centre are inefficient in their peeling, or whether there are other bottlenecks that make processing relatively expensive. If peeling is a factor, peelers may require training on best peeling practises, or more efficient peeling knives. It could also be the case that the way the peelers are being paid –i.e. per 400 kg basket peeled, provides little incentive for efficient peeling. On the contrary, it may even be a disincentive as the workers will be pushed to peel the baskets as quickly as they can without paying much attention to avoiding thick peeling and losses of starch containing flesh. Changing the payment structure for the peelers (for example, by comparing weight before and after peeling) may be an alternative solution to improving efficiency if indeed peeling losses prove to be a crucial factor in high processing costs.

The cost of grating (N 1,500 per t FCR) is also relatively expensive, for example compared with the Bara group (N 600 per t FCR). The current mission had insufficient time to analyse these charges –for example related to fuel consumption, and understand the business plan of the Alapako processing centre. It is, therefore, not possible to advise whether these costs could potentially be reduced, or whether this would impact negatively on the profitability of the processing centre. Further analysis of the Alapako processing centre is therefore advised. Such an analysis could include:

1. A financial analysis of current costs and income An investment appraisal for the purchase of upgraded/more efficient processing equipment
2. Options to lower processing costs and fees for users of the processing centre, without jeopardising the financial sustainability of the centre.

A specific example of such an analysis, namely an investment appraisal for the purchase of an improved gari fryer, is suggested in the next section.

#### 3.2.3.8 Other challenges for gari processors

In addition to the marketing problems and the challenge to improve processing efficiency, the processors indicated that they would like to reduce costs of using the processing centre and use improved processing equipment. In particular, they expressed an interest in mechanised gari frying.

The Alapako processing centre could be supported with an investment appraisal for such a mechanical fryer. The machine is relatively expensive (N1,200,000 for an automatic fryer that uses kerosene) and costs and benefits would need to be calculated. If an automatic fryer proves to be too expensive / not worthwhile for the centre to purchase, an improved manual fryer could be a viable alternative solution to reduce the cost of fuel wood, improve working conditions, and (slightly) improve efficiency.

## Conclusions and recommendations for the rapid assessment method

Testing the rapid assessment method on two village processing groups, Agbelere Farmers and Processors Association in Bara, and Alapako Community Association in Irewolede, has led to valuable insights into both groups as well as useful modifications to the check list.

General recommendations on using the check-list include the following:

1. Using all questions in the list will be time-consuming. It is advised to establish with what purpose the assessment will take place, and what information is required. Using all five components of the assessment will provide detailed insight into the VPG, and help to understand not only internal but also external challenges and opportunities. This holistic overview may be necessary for an investment appraisal or full assessment of the group, but will take up a considerable amount of time for both the respondents and interviewer. It may therefore be preferred to conduct the interview with a small group of well-targeted respondents. For example, if the aim of the visit is to assess a gari-producing group, it may not be necessary to have large numbers of cassava farmers present. However it also needs to be taken into account that a small number of respondents may provide more biased information than a large group, and that the information provided by a few may not be applicable to all. It also need to be verified whether views of the board members correspond with views of the group.
2. It is recommended to develop an Excel template for the calculations of production costs, marketing costs, and profit margins. The template should also include a sensitivity analysis in case various costs or market prices would increase or decrease. The sensitivity analysis in addition would decrease the impact of depending on data provided in a single interview, which may be biased, incorrect, or wrongly interpreted by the interviewer.
3. It needs to be taken into account that a full analysis of a VPG may require more than one visit. A rapid, single-day assessment can focus on particular components of the check-list or a particular cost calculation.

Specific conclusions and recommendations following the assessment of the two VPGs are discussed in section 2.2.2 and 2.2.3, and summarised below.

1. Both the Agbelere Association in Bara and the Alapako Association in Irewolede face substantial marketing challenges. Markets for fresh cassava roots as well as gari markets are flooded and saturated, resulting in low prices and difficult access. It is important to understand whether these low prices are the result of normal seasonal / (multi-)annual fluctuations which may be expected to go up again, or whether the low prices indicate a more serious long-term trend of over-production. Cassava producers and gari processors are price takers rather than price setters and have little to no power to bargain for better prices.
2. No recommendations have been made on lowering the cost of cassava production, as this was not part of the terms of reference for this assessment. The visit did explore the opportunity improve farmers’ income by linking VCDP-supported farmers to better markets. Allied and Atlantic Distilleries Ltd (AADL) could be a potentially profitable market, but conditions attached to selling roots to this buyer need to be further examined. For farmers located far from the distillery processing plant, the high transport costs may rule out supplying AADL.
3. Proving support to strengthen local SMEs could lead to the creation of small markets for some nearby farmers (by supplying the SME with roots). To make this work, marketing challenges for the SMEs themselves will also need to be addressed, in addition to other bottlenecks for SME business development.
4. It should be carefully considered whether growing varieties that are desired by industrial buyers such as AADL and Thai Farm, will not have negative implications for food security.
5. For the farmers at the Alapako Association, cassava production seems to be a profitable business, with a profit margin of ca. N2,450/t FCR for most organic farmers in the groups. However, our calculated production cost figures (ranging from N76,000/ha excl agricultural inputs to nearly N120,000 including cost of inputs) need to be verified with those by VCDP. Cost of cassava production was not calculated at the Agbelere association.
6. It was not clear what the processors at Agbelere (Bara) spend on roots: in the discussion it appeared that root costs are not taken into the equation by the processors (for example, when they are produced within the same household by their spouses) while the Agbelere farmers sell their cassava for N6,400/t incl transport costs. The Alapako processors said to purchase roots at N5,750/t. Both prices have been taken into consideration in calculating the total gari production costs, since the cost of producing roots need to be accounted for. To calculate the income of households that are involved in both processing and production, it is important to understand all costs involved.
7. Despite the higher root prices at the Agbelere group (if N6,400/t FCR is correct), their overall gari production costs are lower (N43,000/t gari vs N54,286 t/gari at Alapako). This is mainly due to a highly efficient conversion ratio of 4.16:1 (i.e. 4.16 tonne of FCR produces 1 tonne of gari). At the Alapako group on the other hand, the conversion ratio is 5.71:1, indicating inefficiency.
8. If the price of FCR would not be taken into account into account, Alapako members spend about N21,413 to produce one tonne of gari (for non-members this is 27,123), whereas the Agbelere members spend approximately N16,833.
9. Potential opportunities for increasing margins at the Agbelere processors’ association include:
	* Improving production efficiency in particular through installing a more efficient manual gari fryer. This will have the important additional benefit of reducing negative impact on health (proper ventilation and reduced amounts of smoke);
	* Support horizontal integration to gari market through strengthening the association to crease their bargaining power, link with higher value markets, or explore the viability of product differentiation.
10. Potential opportunities for increasing margins at the Alapako processors association include:
	* Improving production efficiency in particular through supporting improved peeling practises;
	* Exploring viability of reducing grating costs – although this should not impact negatively on the business plan of the processing centre;
	* Exploring viability of opening a market outlet (e.g. store in town) for direct sales though end consumers, rather than via middlemen at periodic markets. The same may apply to the Agbelere processors.
11. General challenges for both VPGs:
	* Limited opportunities for mechanisation of cassava production due to a) insufficient funds/access to finance, and b) plots unsuitable for mechanisation;
	* Limited access to (affordable) agricultural inputs such as fertilisers and pesticides;
	* Processing infrastructure may be upgraded (investment appraisal advised), plus additional infrastructure such as water boreholes and storage shed (at Agbelere-Bara). The Alapako processors association expressed an interest in obtaining a mechanical fryer for gari production. Although it is likely that an improved manual fryer would be more suitable, a potential investment in an automatic mechanical fryer could be explored in an investment appraisal.

# Case studies of two cassava processing industries in Ogun State

## Allied and Atlantic Distillers Limited, Igbara, Ogun State

Allied and Atlantic Distillers (AADL) are part of a much larger Indian owned group of companies established in Nigeria some 65 years ago. The parent business of AADL imports some 250 million litres of extra neutral alcohol (ENA) per annum for use in the production of wines and spirits. Until recently the company was entirely reliant on ENA imported mainly from Brazil at a cost of 220-230N/litre (US$0.99-US$1.04). Much of the cost of imported ENA is made up of import duties ranging from 100-150N/litre (US$0.45-0.68). Local production of ENA is a possible option for Nigeria’s distillers but has long been hampered by the lack of a sugarcane industry to generate molasses for ENA production.

AADL was established in 2005-2006 to develop local production of ENA using either fresh cassava roots (FCR) or sweet sorghum stems as raw material. The initial plan was to construct a US$30 million plant in Igbara for ENA production using FCR as the source of raw material. This plant would have a capacity of 9-9.9 million litres of ENA/annum and consume 225-250 tonnes of FCR/day. However, the company realised that organising the FCR supply from smallholder farmers would be the critical step for success both in terms of volume of roots and starch content. AADL’s smallholder driven procurement system was established in 2006, but the distillery was not constructed until late 2012. In the intervening time AADL invested in development of a suitable procurement system. Initial efforts focussed on encouraging farmers to grow high yielding varieties of cassava and adopt improved practices aimed at increasing the starch content of the roots. The company employed their own agronomists and extension staff, established demonstration farms and supported early entrants to access planting material and inputs such as fertiliser and herbicides. The smallholders’ confidence in AADL was built by purchasing all of the farmers’ production. In the absence of a distillery AADL acted as a broker selling their farmers roots to other users such as Thai Farms, Ekha-Agro and Matna Starch.

By 2012 AADL had established a network of ~4,300 smallholders with some 5,000ha of cassava spread across 18 LGA’s in Ogun and Oyo States within a radius of 150km from the proposed factory site in Igbara. The distillery became operational in February 2013 and became the sole destination for FCR supplied by the smallholder procurement system. The smallholder procurement system has been successful and AADL is now sourcing 225-250 tonnes of FCR per day on a year round basis. Senior management of AADL are planning to double production at the Igbara site and are considering establishing a second distillery in Oyo State. AADL has the advantage of a stable internal market for all of the alcohol produced by the distillery, their relationship with the farming communities is strong due to consistency and reliability as a purchaser of large volumes of cassava for nearly 6 years. AADL is an attractive option for VCDP farmers in the target LGA’s in Ogun State.

## Matsol Farms Obafemi-Owode LGA

Matsol Farms (MF) is a typical Nigeria cassava processing SME located ~5km north of Sagamu on the Abeokuta-Sagamu Expressway in Obafemi-Owode LGA. The FM site is ~2km from Agbelere Producers and Processors Group in Baara village thus offering potential for smallholder root sales from Agbelere to MF. MF was set up during the Obasanjo era with a 1 tonne per day flash-dryer and associated equipment to produce HQCF and instant-fufu powder. The Obasanjo regime’s policy of 10% inclusion of HQCF in wheat flour created a soft market, as late as 2007 the company was selling to 4 of the big wheat millers in Lagos. However, the change in government resulted in a collapse in sales of HQCF in 2008. Attempts were made to diversify into other products (instant-fufu and packaged gari) and other products but the old style flash dryer (Peak Products single cyclone) was found to be uneconomic to operate.

In 2012, MF received support from the C:AVA project to upgrade their single cyclone flash dryer (improved energy efficiency and product output). In addition the company received a loan from BOI at 12% interest as part of the Federal Governments CTAP to purchase a Nobex Industries 6 cyclone flash dryer and wet hammer mill. The new flash dryer is more energy efficient and has a much higher output than earlier models. The capacity of the Nobex 6 cyclone flash dryer is 3.3 tonnes in 10 hours or ~86 tonnes of dry product per month. If both flash dryers were used production would be ~5 tonnes/day of dry product equating to a daily requirement for 20 tonnes of fresh cassava roots. The current product range includes HQCF, instant-fufu, packaged gari and chin-chin made from 100% HQCF.

However, on the day of the visit production was on a demand basis only and of a sporadic nature averaging 0.5 tonnes per month (just 0.6% of the capacity of the Nobex 6 flash dryer). The company highlighted major issues with marketing of products and some serious technical limitations that combine to restrict realisation of the potential of the business. This is a pity as MF is well situated for easy access to markets and has a management team that has some good ideas for the future. MF has met with VCDP already but is not in a position to sign MOU’s for regular purchases of smallholders’ cassava roots due to the limited and erratic nature of production. The IPCI team felt that it would be useful to explore the key constraints at MF in more detail especially as these issues are common across most Nigerian cassava processing SME’s.

MATSOL’s first constraint is technical issues that increase production costs and make the business less competitive. The MF sites lacks a borehole and has to rely on tankers of water purchased at 10,000N (US$45.25) per 8,000 litre tanker. This is an added cost and also makes the factory reliant on external water supplies. MF has two generators one of 100KVA capacity and the other of 250KVA capacity, neither of which was working on the day of the visit but we understand that the factory normally relies on the 100KVA unit due to the unreliable nature of national grid power. However, the factories power requirements could easily be served by a 40KVA unit. This has serious financial implications as a 100KVA generator will use ~46% more fuel for the same loading. The generator house is located ~100m from the factory building making it impractical to save energy through simple waste heat harvesting measures. MF does not have its own transport and as a result has to hire vehicles for delivery of FCR. The delivery cost for FCR (in September 2015) was 14,000N/tonne of FCR (US$63.35). The owner estimated that costs could be reduced to 11,000N/tonne of FCR (US$49.77) if he had his own 5 tonne truck. The IPCI team noted that at Agbelere (2-3km away) farmers were keen to sell FCR at a farmgate price of 6,400N/tonne of FCR (US$28.96) it seems logical that even with transport over 2-3km the price for FCR from these farmers should still be <10,000N/tonne of FCR.

The owner of MF complained of the high cost of production of HQCF and instant-fufu (~94,920N/tonne or US$430) whereas major mills are only offering 80,000N/tonne (US$362) for HQCF. Due to the limited nature of production the owner is only using the older upgraded single cyclone flash dryer for short periods of time each month. Thanks to the C:AVA project the owner has been able to prepare a reasonable breakdown of costs under current conditions. The IPCI team has prepared a quick estimate of the cost savings that could be made by purchasing a truck for transport of roots, installing a 40KVA generator and using the more efficient Nobex 6 flash dryer (see table 10).

With a few simple improvements production costs could be reduced by 28%, further reductions could be made by installing a waste heat recovery system on the 40KVA generator) and improving management of production. However, these measures will only be worthwhile if MF has reliable and consistent markets for its products.

**Table 10** Comparison of Matsol Farms current production costs for 1 tonne HQCF/instant-fufu with potential savings on raw material costs, energy and power.

|  |  |  |
| --- | --- | --- |
| **Item** | **Current cost (N)** | **Potential cost (N)** |
| FCR (conversion 4:1) | 56,000 | 44,0001 |
| Peeling | 8,000 | 8,000 |
| Kerosene for dryer | 18,000 | 6,7002 |
| Diesel for genset | 6,000 | 2,2003 |
| Milling | 2,000 | 2,000 |
| Packaging | 1,720 | 1,720 |
| Labour | 2,700 | 2,700 |
| Other costs | 500 | 500 |
| **TOTAL** |  **(US$429.5) 94,920** |  **(US$306.88) 67,820** |

1 – Assumes access to own 5 tonne truck (purchased second-hand for ~2 million Naira) reducing cost to 11,000N/tonne FCR

2 – Assumes optimal use of Nobex 6 FD for 10 hour shift in place of upgraded single cyclone FD with kerosene at the revised price of 89N/litre, at the old 160N/litre price the cost of kerosene would be 12,160N/tonne of dry product.

3 – Assumes optimal use of Nobex 6 FD with 40KVA generator in place of the oversized 100KVA unit.

Matsol’s second constraint is market development. Matsol produces HQCF, instant-fufu powder, packaged gari and 100% HQCF chin-chin but sales are limited and the market opportunities have not been well developed.

MF primary product was intended to be HQCF as a partial substitute for imported wheat flour in bakery products. The company has focussed past efforts on trying to sell to the major wheat millers in Lagos but the top price offered is 15% lower than the cost of production making supply impossible. Reducing production costs would help but wheat millers are unlikely to offer a good market for an SME such as MF. The big mills have little real interest in HQCF and are wary of buying small volumes of HQCF from large numbers of SME suppliers with the associated risk of variable quality and possible damage to brand image. FMN are the only mill to invest in HQCF and composite flours and their approach has been to process their own HQCF on a large-scale with markets focussed on bulk sales to large food processors in Lagos and Ibadan.

The obvious market for an SME such as Matsol is to try and sell HQCF directly to smaller bakeries and food processors close to the factory to reduce transport costs and avoid problems of unachievable volumes. MF has had success selling HQCF to Tope Biscuits in Sagamu 3km from Matsol’s factory. Tope use 10% HQCF in class “C” biscuits. HQCF costing 100,000N (US$452)/tonne is cheaper than wheat flour costing 150,000N (US$679)/tonne. Given the tight margins in class “C” biscuits even 10% inclusion is attractive to the biscuit maker.

Rural bakers could use HQCF at up to 20% inclusion without serious adverse effects on loaf volume and colour, but the baker would need to make changes to their recipe (mostly increased water and yeast) and adopt different baking techniques when using HQCF to get the best results. For rural bakers blending of HQCF and wheat flour could present problems making it desirable to pre-blend the flour. Bakery improvers can be used to improve product quality and robustness in product handling at HQCF inclusion rates of 20-25% but the cost of the improvers appear to make them uneconomic. MF is correct in believing that successful marketing of HQCF to the rural bakery sector will involve considerable promotion with demonstrations, training and recipe support to enable bakers to take advantage of HQCF. Pre-blending by MF is an interesting possibility but would need access to a mixing facility which is not currently available at the MF factory.

MF is also interested in the potential market for HQCF for use in preparation of chin-chin. Chin-chin is a popular Nigerian snack traditionally prepared using wheat flour. Recently several companies have started marketing 70g packs of wheat flour chin-chin for retail sale by street vendors at 50N per pack in competition with sausage rolls, plantain chips and small packs of biscuits. This market is expanding and appears to offer an opportunity for HQCF. Flour makes up 68% (by weight) of the typical chin-chin recipe, thus for a 100kg batch the cost of wheat flour would be 10,200N (US$46.15). HQCF can be used as a 100% replacement for wheat flour in chin-chin, thus for a 100kg batch the cost of HQCF would be 6,800N (US$30.77) a saving of 33% over wheat flour. 100% HQCF chin-chin is similar in appearance and taste to wheat flour chin-chin but has a much firmer and crunchier texture, this might even be an advantage as many consumers prefer a crunchier chin-chin.

MF has produced batches of 100% HQCF chin-chin. The product is packed into 70g packs. A bag containing 13x70g packs (total weight 910g) of chin is sold at a wholesale price of 500N (US$2.26) equivalent to 549N (US$2.48)/kg. The suggested retail price of 50Nx13 packs gives the retailer a profit of 150N (US$0.68) per wholesale pack. HQCF chin-chin appears to have real potential but MF needs support to promote the concept to the smaller chin-chin makers who face competition from a mass marketing campaign and nicely packaged product from FMN (the largest food business in Nigeria). MF really needs better facilities for demonstration of 100% HQCF chin-chin to existing chin-chin makers.

Instant fufu powder is essentially a fermented version of HQCF with a similar process with the addition of fermentation for several days in tanks. The production cost is similar to HQCF but the price structure and market are quite different. Instant-fufu is popular among higher income urban consumers in South Western Nigeria and overseas. MF sells instant-fufu powder for 200N (US$0.90)/kg wholesale (equal to 200,000N (US$905)/tonne with a suggested retail price of 250N (US$1.13)/kg. Instant-fufu has a more attractive price than HQCF but the market remains small with stiff competition from other producers. Market development requires aggressive marketing, high-quality and competitive pricing strategy (and hence maximum efficiency to minimise production costs). It makes sense to optimise production to reduce costs as much as possible, increase margins and options for price cutting. As an example Niji-Lukas is selling 12 tonnes per week of instant-fufu powder to major retailers in Lagos, his product is 25% cheaper than Matsol Farms.

Packaged gari appears to be an attempt at product diversification to supplement income from sales of HQCF and instant-fufu. Gari is produced by the traditional method but MF has access to improved frying units equipped with an exhaust chimney to reduce smoke inhalation by the operator. Gari is sold wholesale in 2kg packs for 250N (US$1.13) equal to 125N (US$0.57)/kg ) with a suggested retail price of 300N (US$1.36) per 2kg pack. MF lacks a distribution network and had not managed to develop this market as of September 2015. Packaged gari is a very small nich market in Nigeria with sales of only 300-400 tonnes/year via high-end local outlets and export sales. The majority of Nigerians prefer to buy gari on the open market as prices are much cheaper and the customer has the opportunity to handle the gari and judge quality. MF wholesale price of 125N/kg appears uncompetitive given that gari can be purchased wholesale in nearby Sagamu market for between 30-45N (US$0.14-0.20)/kg. If MF develops this market they might be well advised to purchase gari in bulk from the processors in Agbelere and re-package it for sale via high-end outlets such as Shoprite and petrol station shops in Lagos, this is likely to offer a much better margin than making their own gari.

Matsols third major constraint is finance for re-investment and development of the business and working capital. Commercial bank interest rates of 27-30% are not realistic for SME’s. The BOI’s rate of 12% is theoretically better but conditions such as collateral of 30million Naira for a 10million Naira loan are unaffordable for a business such as Matsol. MF would be keen to access the 70:30 finance facility of VCDP and technical support for rehabilitation of the business. The owner of Matsol estimated that the factory would require between 10-15 million Naira (US$45,000-68,000) for infrastructural improvements, market development and working capital to put the business on a solid footing. In reality a thorough business analysis is required including development of a bankable business plan to determine the viability of investing in Matsol Farms.

Matsol Farms is a good example of the need for an integrated approach to value chain support for successful commercialisation of cassava. MF could offer an outlet for 4,000-4,500 tonnes/year of FCR from smallholder farmers but it is not simply a matter of signing an MOU with the SME or linking the farmers to the SME. In the case of the majority of Nigeria’s cassava SME’s technical, financial and business economics support are required to optimise efficiency of factory operations, business management and market development. VCDP could play an invaluable role in provision of soft financing via the 70:30 mechanism and linking the SME to efficient smallholder farmers. VCDP could work with IPCI to link with C:AVA2 for provision of support for technical and market development.

# Establish contact with equipment fabricators, national fabricators forum and identification of potential information platforms

## Discussions with the Agricultural Machinery Equipment Fabricators Association of Nigeria (AMEFAN)

Leading members of Nigeria’s agricultural machinery fabricators community have made several attempts to establish associations of fabricators to lobby government for financial support and try to standardise manufacturing practices. These efforts have not been sustainable and the various associations, although existing on paper, are in practice defunct.

Recently the owner of Niji-Lukas Group has established the Agricultural Machinery Fabricators Association of Nigeria commonly known as AMEFAN. AMEFAN has ~16 fabricator members and is recognised and supported by the Nigerian Association of Engineers (NAE) and the Federal Institute for industrial Research, Oshodi (FIIRO). AMEFAN is aiming to strengthen Nigerian fabricators to compete against imports mainly from Brazil. Affordable finance is seen as a key issue by members and preliminary discussions have been held with the Bank of Industries (BOI) to seek access to soft financing mechanisms. The head of the association, Mr Adeniji, is also optimistic that AMEFAN could work with BOI to purchase imported raw materials such as sheet metals, motors and electrical fittings in bulk and thus reduce manufacturing costs. AMEFAN are also interested in the potential for lend lease mechanisms to make it easier for fabricators to buy more complex machines such as lathes and vertical/horizontal mills. AMEFAN is working with NAE, FIIRO and the Standards Organisation of Nigeria (SON) to explore the possibility of establishing manufacturing and operating standards and a certification system for fabricators. It is hoped that this will improve manufacturing standards and give customers greater confidence in Nigerian made machines. FIIRO would provide training to upgrade the skills of the fabricators and SON would establish legal standards and an inspection and certification system with a register of approved businesses.

AMEFAN has many laudable aims but it should be noted that the association is very young and does not have a website or even a clearly defined physical address. Looking at the membership list and talking with various fabricators it became clear that some of the biggest and most successful fabricators have chosen not to join AMEFAN. One fabricator said that he saw no point in joining as he believed the association was created for purely political ends and will not be sustainable. A member of AMEFAN said he had been disappointed with membership so far as there had been no obvious benefit to his business.

On this basis it would probably be best to collaborate with AMEFAN where appropriate and maintain a watching brief on progress with the associations activities. The role of host for any e-platform would better be assigned to a university such as FUNAAB as they have well established and sustainable resources and are external to the politics of the fabricating industry.

## Discussions with Deban Faith Agro-Ventures, Nobex Technology Ltd & Niji-Lukas

4.2.1 Deban Faith Agro-Ventures of Abeokuta (Ogun State) is a good example of the smaller Nigerian fabricators with limited resources. The owner is a former employee of Peak Products Limited who established his own business 8 years ago to manufacture cassava graters, jack-presses, gari-fryers, hammer mills, starch extractors and single cyclone flash dryers. The workshop has limited equipment in the form of basic hand tools, side grinder, arc welder and a pillar drill. There is no access to lathes, milling or casting facilities all of which can only be sourced in Lagos. During the visit saw an example of a jack press with 32 tonne jack for 75,000N (US$339), a 4kw cassava grater with a stated capacity of 2tonnes per hour of FCR for 200,000N (US$905) and an open pan manual gari fryer for 150,000N (US$679). The built quality of this basic equipment appeared adequate for use by a VPG.

The owner also had a single cyclone flash dryer on display. This unit was obviously derived from an early Peak Products design with a very primitive and highly inefficient single tube single pass heat exchanger, crude unbalanced locally made fan assemblies and a primitive material feed inlet. Heat was provided by a Chinese made Bairan type pressure jet burner running on kerosene (N120/litre at the time of research). The owner claimed an output of 160kg/hour of dry product which is highly optimistic for this type of dryer (experience indicates that ~100kg/hour would be more realistic). The owner of the company reported that he has had support from IITA and has supplied examples of this type of flash dryer to factories in Malawi, Madagascar, Tanzania and Zambia. NRI has had the opportunity to examine the units in Malawi, Tanzania and Zambia and can confirm that this type of dryer requires modification in order to work efficiently. Deban Faith Agro-Ventures are hampered by the facilities at the factory and the limited capacity of the engineering staff. This type of fabricator would benefit from mentoring and support to improve the quality of their designs and production standards. Support is also needed to develop concepts such as after-sales support and provision of spares.

The owner is a member of the Agricultural Machinery Equipment Fabricators Association of Nigeria (AMEFAN) but said he not benefited from membership and was unclear as to how AMEFAN could help him to grow his business. The IPCI/VCDP e-platform concept was discussed and met with approval. The owner of Deban Faith Agro-Ventures could see benefits from improved standards and an independent platform for wider promotion of his business.

4.2.2 Nobex Technology Limited of Ikotun, Lagos (Lagos State) is probably the largest and best equipped fabricator of cassava processing equipment in Nigeria. Nobex has two factories in Lagos with well equipped workshops for the design and fabrication of a wide range of food processing equipment. Nobex is situated close to other workshops having the capacity for specialised casting and machining of more complex components. The C:AVA team have evaluated many examples of Nobex equipment and were completely satisfied with design and build quality and after sales support. Nobex produces the most energy efficient small-scale flash dryers in Nigeria, overall performance meets international standards. In direct contracts with SME’s in South Western and North Central Nigeria, Nobex has contracts with several donor funded projects, examples include the Japanese Embassy, European Union, Bill and Melinda Gates Foundation and the World Bank.

Of potential interest to the VCDP as part of the proposed upgrading of facilities at village processing groups Nobex produces a modern jack press with 32 tonne jack for 150,000N (US$679) and a manual gari fryer with exhaust chimney for 120,000N (US$543). The press and gari fryer are the best quality that we have seen in Nigeria. The manual fryer consists of a 1.2x1m 3mm thick stainless steel pan fitted with a 3mm thick steel underliner to protect the underside of the pan from direct heat. The pan is mounted on a 60cm high double layered 2mm steel structure with 10cm of fibre glass insulation and sealing to improve thermal transfer and prevent leakage of smoke and loss of heat energy from the combustion chamber. The firebox is fitted with a chimney to remove fumes away from the operator. This pan is intended for use by one person and is designed so that the section of the pan closest to the firebox has ample heat for frying, the further end of the pan is cooler but still hot enough for drying the fried gari.

A mechanised fryer is also available at a cost of 1.2 million Naira (US$5,430) for the basic unit with wood fired furnace. The fryer can also be supplied with a pressure jet burner running on kerosene as an alternative to the wood fired option for 1.5 million Naira (US$6,787). The mechanised fryer has a capacity of 500kg of gari in 8 hours. The pressure jet burner has the advantage of a cleaner and more efficient burn when compared to wood but requires 6 litres of kerosene per hour of operation (96 litres of kerosene per tonne of gari). The mechanised fryer has a rotating paddle system which can be supplied with either a 3 phase 1.5KW motor or a 3.75KW single phase motor. A small 12.5KVA (10KW) generator will provide sufficient power to run 3 mechanised gari fryers without overloading if 3 phase power is used.

Nobex have recently hired an IT specialist to develop a website for the company. Nobex intends to have an interactive link on the site and smartphone app that will provide customers with a point of contact for requests and feedback. It is intended that the smartphone app will have provision to link customers direct to members of Nobex engineering team for problem solving and trouble shooting. Nobex have already prepared a library of short films to showcase that can be used for showcasing their products and also for online training.

Nobex is very interested in the IPCI/VCDP proposals for an e-platform for Nigerian fabricators. The owner of Nobex believes that the platform should be hosted by an independent organisation as this would avoid issues of local politics between fabricators and ensure sustainability of the platform. Nobex suggested FUNAAB as a logical choice for hosting the site due to their independent and respected position and access to strong IT facilities from within the University system.

Nobex is aware of the existence of AMEFAN but said he is not a member. He felt that AMEFAN has laudable objectives but is unlikely to achieve them due to limited resources and internal divisions among the Nigerian fabricators. He mentioned two previous attempts by major fabricators to form national associations that failed to deliver real benefits after the initial meetings.

4.2.3 Niji Lukas Group of Isheri, Lagos (Lagos State) is one of the largest fabricators of cassava processing equipment in Nigeria. Niji Lukas (NL) fabricates the usual range of graters, presses and hammer mills. In addition the company manufactures on of the best single cyclone flash dryers on the market with a output of >150kg/hr of dry product. Niji Lukas partners with German and Chinese companies to import other machinery such as cassava “peeling” machines, pressure jet burners, hydrocyclones, centrifuges and membrane filter press units. NL produces a high quality mechanised gari roaster with electrically powered agitating paddles. Heat can be provided via wood fired furnace or a pressure jet burner. The mechanised gari fryer costs 1.2 million Naira (US$5,430) for the basic wood fired option, the pressure jet burner version costs 1.5 million Naira (US$6,787). NL’s equipment is manufactured to a high standard comparable to that supplied by Nobex Technology Ltd.

NL is unusual is having his own 3,000 acre cassava farm in Oyo State and factory producing HQCF, gari and instant fufu powder using his own processing equipment. Integrating primary production with processing has enabled NL to reduce his FCR costs to between 4,000-5,000N (US$18.10-US$22.62) /tonne of FCR which is less than half that of most SME’s. He has developed a successful business supplying ~12 tonnes/week of 1kg packs of instant fufu powder to a network of retailers in Lagos. Instant fufu powder is priced at 150N (US$0.68)/kg wholesale and 200N (US$0.90) retail. NL’s wholesale price for instant-fufu powder is a valuable lesson in the importance of minimising production and processing costs to deliver a competitive product. Blopamed who used to be a major supplier of instant-fufu powder charge 300N (US$1.36) /kg wholesale for their instant-fufu powder. The quality is excellent but the price is completely non-competitive being twice the price of the Niji Lukas product. Matsol farms instant-fufu powder is 25% more expensive than NL product with similar negative implications for market development.

The owner of NL is the founder of the Agricultural Machineries and Equipment Fabricators Association of Nigeria (AMEFAN). He expressed strong support for the IPCI/VCDP e-platform and saw close synergies with the activities of AMEFAN. Although AMEFAN does not currently have a functional website he still felt that AMEFAN as a private sector driven organisation would represent the ideal host for the e-platform.

# Conclusions and recommendations

The IPCI-VCDP joint mission in Ogun State in September 2015 was most informative in providing information to refine our thinking and to start the process of development of joint plans for activities in 2016.

From the field visits it was clear that AADL as a large-scale business specialising in ethyl alcohol with an extensive and expanding network of smallholder farmers within its procurement system had the most potential to link with cassava farmers in the VCDP target LGA’s. VCDP & IPCI can work together and collaborate with the C:AVA2 project to support farmers to adopt better agronomic practices to improve starch content and overall yields so as to reduce unit costs and improve the profitability of farming. Although the team was not able to visit Thai Farms International (TFI) during the visit experience from C:AVA2 and other projects would suggest that TFI could be less useful to VCDP as they are more focussed on procurement from large-scale farms in Kwara State. Some farmers met with during the current visit had tried to supply TFI but had found the cost of delivery to the factory to be too high even at 1 hour’s drive from the factory.

The SME’s visited during the project revealed a raft of problems with business management, equipment, finance and marketing. MATSOL farms which is located within the coverage area of the VCDP showed potential to become a viable business with support. It is **recommended** that VCDP considers extending the provision for support to MATSOL and other similar SME’s by modifying the 2 tonne FCR per day limit for SME’s to 25 tonnes FCR per day. IPCI can assist VCDP in evaluation of SME sites and development of credible business plans for re-investment, we could also provide mentoring of SME’s that receive support under VCDP. If C:AVA2 can be linked into the VCDP/IPCI work it would be possible to provide more technical support to improve the efficiency of the businesses.

The VPG visits were most encouraging and these groups do merit and need support to implement better practices in primary production, to adopt better processing techniques and to improve business management and marketing. If VCDP can provide the financial support for the groups, IPCI can play a useful role in development of business plans and mentoring of groups that receive support from VCDP. A partnership with C:AVA2 is encouraged as this will facilitate access to markets and opportunities to benefit from training activities conducted under C:AVA2.

Discussions with fabricators of agricultural processing machinery demonstrated interest in the proposed e-platform for fabricators. IPCI will continue to develop a pilot version or demonstration model and then liaise with VCDP and fabricators to start testing and development of the platform in Nigeria during 2016. The host organisation for the platform could be FUNAAB but this can remain open to be finalised by stakeholders during 2016.

Following a de-brief session held at the VCDP offices in Abeokuta the following general points were agreed between the IPCI and VCDP teams:

1. Capacity building inputs for farmers, processors and other VCDP stakeholders via collaboration with the C:AVA2 project (to increase the available resources as IPCI funding is limited). The capacity building activities should help with adoption of good agricultural practices, improvement of processing technologies, business management and marketing among others.

2. Development of business plans for VPG’s and SME’s identified during the visit (namely Matsol SME, Agbelere and Alapako VPG’s. Additional VPG’s and SME’s will require further assessment activities, the approach taken will depend on the level of resources available but may involve IPCI training VCDP personnel to conduct the evaluations and then offering mentoring and back-stopping support.

3. Provision of technical inputs and recommendations on processing machines and linkages with fabricators. IPCI can provide an independent view on quality and value for money based on extensive experience of the many players in the Nigerian agricultural machinery sector.

4. IPCI will develop a pilot version or demonstration model of the e-platform for fabricators and then liaise with VCDP and fabricators to start testing and development of the platform in Nigeria during 2016.

5. IPCI will use their institutional linkages to encourage closer collaboration with C:AVA2 as there are clearly strong synergies between VCDP, IPCI and C:AVA2.

6. IPCI will assist in developing the linkage between AADL and smallholder farmers supported by VCDP but this will require further inputs in order to better understand the detailed business case for smallholder farmers supplying AADL.

7. IPCI will use their institutional links to explore the potential for development of innovation platforms for knowledge sharing between IPCI, VCDP and C:AVA2.

**Follow-up:**

There is clearly much that IPCI can offer VCDP in Ogun State but resources are limited and have to spread over a much wider geographical coverage than Ogun State or even Nigeria. The priority for the IPCI partners active in Nigeria (NRI and FUNAAB) will be to examine their IPCI budgets closely and then work together to develop a joint action plan for 2016. This action plan will then be discussed and agreed with VCDP and IFAD so as to integrate the IPCI activities as closely as possible with the planned activities of VCDP.

FUNAAB and NRI are also senior partners in the C:AVA2 consortium and will look at the possibility for leverage of activities via closer partnerships between C:AVA2 and IPCI & VCDP.

VCDP now need to consider following up this survey in the other project target states.

# Annex 1. Questionnaire for assessment of SME’s and VPG’s

The objective is to understand the current status of the SME/village processing group (VPG), and to identify areas where VCDP support can improve the business (for example, through loans, technical support, training, establishing forward/backward linkages, mentoring, etc).

1. **Overview of the business**
2. General information
	1. Name of SME/VPG
	2. Location
	3. Name of SME owner / number of VPG members (m/f)
	4. Name of respondent (if respondent is not the owner)
	5. Contact details
	6. Start of operation (month, year)
3. Products
	1. What products are produced?
		* Gari
		* Fufu (instant)
		* Fufu (wet)
		* Lafun
		* HQCF
		* Native cassava starch
		* Edible starch (local/fermented)
		* Ethanol
		* Chin-Chin
		* Other cassava based products, namely …………..
		* Other products/services (not cassava based), namely…………………..
		* Business is not operating at this moment
	2. Has the processer produced other products in the past that are not currently produced? If yes, why stopped?
	3. Are there plans to start other products in the future? If yes, how has this opportunity been identified?
	4. Are there any waste- or by-products? If yes, what is done with them?
4. Capacity
	1. What is the theoretical production capacity per day/month (in kg or tonnes), for each product produced?
	2. What is the actual quantity produced per day/month, for each product?
	3. How much did the business produce in the past year, for each product?
	4. How many days per month is the business operational?
	5. How many hours per day is the business operational?
	6. Are there high and low production seasons during the year? If yes, specify.
	7. Specify any plans to increase production levels: meet full capacity or expand beyond.
5. Marketing
	1. Where are products sold (type of buyer, location)?
	2. For each product: how much has been sold (in past month/year), at what price? Are there different prices for different grades / quality classes?
	3. Are these regular or casual sales?
	4. Are there any contracts with buyers? What are the payment terms?
	5. Have sales increased or decreased over the past months/years? (Why?)
	6. Have market prices increased or decreased over the past months/years? (How has this trend developed?)
	7. Will the business be able to further expand its market? If yes, how?
	8. Are there any bottlenecks/challenges in growing the business?
	9. What kind of information or actions are required for the business to improve sales?
	10. What are the competing products on the market?
	11. Does the processor need to pay for transport cost to buyer? If yes, how much? Are there other marketing costs?
	12. Is packaging important for the business? How is it done, how can it be improved?
6. **Processing and production**
7. Draw simple flow chart of processing steps for the product(s) produced
8. Raw material supply
	1. Quantity of fresh cassava roots (FCR) used per day?
	2. Details of price and availability of the roots in the geographical area /supply radius, including information on seasonality (price trends and availability).
	3. Preferred starch content (and seasonal trends), cassava varieties, maturity, etc. Is a premium paid for higher quality (how much)?
	4. How many farmers/groups does the business source from?
	5. What kind of farmers are these? Small scale, large scale, farmer groups, etc?
	6. What are the kind of arrangements with them, e.g. spot sales, outgrower scheme, contracts, regular sales, etc.
	7. Are there any issues with the procurement of regular quantity and quality of roots, including competition from other buyers?
	8. Who is responsible for harvesting? (cost associated with harvesting if applicable)
	9. FCR delivered to factory gate, or have collected? (details of transport, distance, costs)
	10. What are the payment arrangements for FCR (cash on delivery, payment terms)
	11. (Plans for) own production of FCR (quantity, % of total)
	12. If business grows its own FCR, are the cost of the raw material and transport taken into account when establishing the cost of production?
	13. For all products produced: what is the conversion rate for FCR : product (…. kg roots : 1000 kg product)
9. Water supply
	1. Where does the business get its water from (mains, borehole, open well, river, etc); what is the distance to the water source?
	2. How much water is used (per time unit –e.g. month), how much does this cost?
	3. What is the water used for?
	4. Are there any problems with water supply?
10. Power supply
	1. Does the business use petrol/diesel engines, electric motors, or a combination? (if yes, give details)
	2. Do you use electricity? If yes, how is this generated (national grid (NG), generator, both)?
		1. If national grid: how reliable is this? What are the units consumed (KWh) and unit costs?
		2. If generator: what is the size, hours of operation, fuel consumption, type of fuel used, cost of fuel (per litre)
		3. If both: what percentages (how much NG, how much generator?)
11. Processing and equipment
	1. Is the peeling of FCR done mechanically or manually?
		1. If mechanically, what type of machinery; operation details)
		2. If manually: number of peelers/day; no of hours spent on peeling; FCR quantity peeled per day; type of knife used; cost of peeling (pay per day/hour/month/quantity peeled?)
	2. Mechanised/manual chipping (details of chipping machines if applicable), incl time/costs
	3. Mechanised/manual grating (details of grating machines if applicable), incl time/costs
	4. Details of any presses used for de-watering (incl time it takes to press, and costs)
	5. Details of any fermentation processes / containers (incl time and costs)
	6. Details of any artificial drying equipment (incl time and costs)
	7. Details of any frying equipment, including fuel source and price
	8. Details of milling and sifting equipment (incl time and costs)
	9. Details of any other processing equipment used (eg for starch extraction, etc)
	10. Details of packaging (type, size, cost of bags, etc)
	11. Does the business store final products? (details of facilities, length of storage, cost, etc)
	12. Indication of losses during processing (%, at what stage?)
12. Drying –if applicable (e.g. sun drying, flash drying, other).
	1. Is there any solar drying involved in the processing? If yes, provide details: capacity, area, etc)
	2. In case of mechanical drying, provide details of fuel used (solid, diesel, kerosene, etc), including price. Add details of moisture content (MC) before and after drying.
13. Capital investment and infrastructure
	1. If possible, provide costs of any buildings, land, storage tanks, processing equipment (see 9), boreholes, etc. What has been the capital investment in setting up the site?
	2. Are there any missing or defective features that could impact on the business?
	3. Who owns the site (including land) and structures?
14. **Management and labour**
15. Labour requirement
	1. Number of workers and types of jobs required for processing
	2. Source of labour (family, group members, hired labour, etc)
	3. Is this casual or permanent labour, what are the arrangements?
	4. Cost of labour
16. Management
	1. Who is in charge of managing operations, and what are their responsibilities?
	2. Has the business got a business plan? If yes, what is in it?
	3. Does the manager/owner have a clear understanding of exact costs and revenues?
	4. How is quality controlled?
	5. Details of quality specifications/standards –processing and consumption.
17. **Enabling environment for business**
18. Registration
	1. Is the business registered (e.g. NAFDAC)? Where?
	2. Ease of registration?
19. Networks and associations
	1. Is the business/owner a member of any processor associations/networks/lobbying groups? If yes, what are the perceived benefits or shortcomings?
	2. Does the business make use of any market information systems, formal or informal? If yes, provide details.
20. Finance
	1. Details of how the business is financed, capital and operational costs (to cross-check with earlier questions), details of overheads
	2. Details of any loans (size, provider, interest rate, conditions, etc).
	3. Are there any problems with finance or accessing credit? If yes, provide details.
21. Policy and other institutional factors
	1. How does government policy affect the business? Any positive or negative Government interventions or policies, regulation and legislation re interest, inflation, tax, import duties, market interventions, etc?
	2. Is the business affected (negatively or positively) by inadequate or improved infrastructure? E.g. roads, warehouses, communication, energy, etc?
	3. What are the main risks for the business (including market developments), and has the owner got any insurances for this? If not, what are other ways to manage these risks?
22. Future plans
	1. Any plans for the future, ideas for improvement, particular challenges that need to be overcome?
	2. Anything else that the respondent would like to underline, or discuss?
23. **Governance of processing groups (VPGs)**
24. Governance and representation (this question applies only to producer/processing groups)
	1. How many members are on the group Board (men and women)? Election process?
	2. Do group members feel that they are well represented by the Board?
	3. Do member perceive that the group is beneficial for their personal interests? Are there any challenges? (provide details)
	4. What structures are in place to resolve disagreements?

# Annex 2. DRAFT Outline TOR for visit to Nigeria by NRI/FUNAAB team to conduct activities in support of the IFAD funded VCDP in Ogun State

**Version 1**

Following on from the initial visit by members of the IPCI team to Abuja and Minna in April 2015 (see mission report at <http://projects.nri.org/cassava-ipci/>) we propose the following activities with a focus initially in Ogun State. These Terms of Reference (TOR) are presented in outline for discussion and modification by the key stakeholders prior to the start date of the mission. The NRI / FUNAAB team proposes 3 activities during the coming visit. We will supply techno-economic expertise from UK and Nigeria but will naturally be looking to integrate closely with the VCDP team in Ogun State to maximise opportunity for transfer of knowledge.

**1. Rapid market and processing infrastructure assessment** (IPCI activity 1.2 “Implement specific market studies”)

IPCI will provide a techno-economic team from NRI & FUNAAB to develop and implement a method (with appropriate check-lists) for rapid assessment of existing SME and processor groups for cassava products such as HQCF, gari, fufu and lafun. The following general criteria will be taken into account as part of the study:

* Quickly assess under-performing small, to medium scale cassava processing operations in target states;
* Identify market segment ‘best bets’;
* Propose upgrading (for follow-up PPP);
* Identify potential for technical support tie-in with proposed VCDP activities;
* Identify suitable training activities;
* Look for potential fabricator ‘champions’ (see below);
* Look for turn-around opportunities;
* Assess investment costs for a potential matching grant;
* Calculate a minimum investment cost for upgrading, including break-even; and,
* Make a standard approach for roll-out by VCDP to other states.

The assessment system will be field tested by the NRI/FUNAAB team in close collaboration with staff from the VCDP project in Ogun State. This will allow VCDP to take ownership of the method, make modifications for practical purposes. It not be possible for the NRI/FUNAAB team to cover all SME’s & processing groups in Ogun State during the mission but VCDP will have the opportunity to widen the assessment to further sites post our mission. Once the assessment model has been proven in Ogun State, we will work with the VCDP in team in Benue State to conduct a similar study as part of a second mission (not yet scheduled). It is likely that for this mission our team will seek to provide training and mentoring for the VCDP in Benue rather than conducting the work ourselves due to resource limitations.

NRI & FUNAAB have identified an initial list of SME’s and processing groups for assessment in Ogun State. These units were selected on the basis of having some level of operational capability:

|  |  |
| --- | --- |
| **Name of SME or processing group** | **Product range** |
| 1. Blopamed Nigeria (SME) | Dry-Fufu & HQCF |
| 2. El Rasheed (SME) | HQCF & Native Cassava Starch |
| 3. Fadett (SME) | HQCF |
| 4. Peak Products (SME) | HQCF & Native Cassava Starch |
| 5. Open Door (SME) | HQCF & Gari |
| 6. Ilugan North Cassava Processors (Processing Group) | HQCF, Gari, Wet-Fufu & Lafun |
| 7. Temidire Group (Processing Group) | Gari, Wet Fufu & Lafun |
| 8. Agbelere Cooperative Society (Processing Group) | Gari |
| 9. Obalegbe Cassava Processing Group (Processing Group) | Wet-Fufu & Gari |
| 10. Ifesoapo Cassava Processing Group (Processing Group) | Gari, Wet-Fufu & Lafun |
| 11. Farmers’ Cooperative Multipurpose Ltd (Processing Group) | Gari, Wet-Fufu & Lafun |
| 12. Igbaotun Cassava Processing Group (Processing Group) | Gari, Wet-Fufu & Lafun |

Source: C:AVA data 2008-2015

The team has details of 26 non-functional SME’s sites for cassava processing in Ogun State but these have been set aside for now as some have been abandoned while others have absentee owners with no interest in re-investing in cassava processing.

**2. Case studies of two cassava processing businesses in Ogun State**

(IPCI activity 2.2 “Case studies of innovative technological solutions, practices and/or experiences”).

An initial framework has been agreed for these case studies see IPCI Periodic Report No1 page 18.

Large-scale and SME type cassava processing operations can offer alternative markets for cassava roots produced by smallholder farmers. However, many challenges are faced by the famers and processors in establishing smallholder inclusive supplies of raw material. SME processors also face technical financial, managerial and marketing challenges. We propose exploring the story of smallholder inclusive raw material chains (for large-scale & SME businesses) and wider challenges faced by SME processors in more detail. We have chosen two businesses to use as case studies:

1. Allied and Atlantic Distillers Limited (working with FUNAAB & NRI as part of the C:AVA2 project) a large-scale producer of cassava-based ethanol in Igbara (Ogun State) who source ~250 tonnes FCR/day from small-scale and emerging commercial farmers in a 150km radius from the factory. The company has a sophisticated and well managed system for smallholder driven procurement of cassava roots. AADL’s procurement system is operation in the VCDP LGA’s namely Yewa North, Obafemi-Owode and Ewekoro thus providing a strong tie in with other activities by VCDP in support of smallholder farmers.

2. Open-Door Limited (working with FUNAAB & NRI as part of the C:AVA2 project) an SME producer of HQCF and gari located close to Igbara (Ogun State). Open-Door are a long established cassava processing industry who have overcome many challenges and re-invested in cassava processing since 2012. The company offers an opportunity to look at the full range of procurement, technical, financial, managerial and marketing challenges faced by SME’s and the innovative ways that management can use to re-vitalise this type of business.

**3. Establish contact with national fabricators & processors forum & Identification of fabricator champions & information platforms** (IPCI activities 3.1 “regional cassava processors and fabricators forum” 3.2 “revised, updated and sustainable WCA equipment database”)

This work will involve arranging a meeting with NICAPMA (Nigerian Cassava Processors and Manufacturers Association) to discuss inputs under activity 3.1, following up on contacts with a range of cassava processing equipment fabricators, suppliers and information providers in South Western Nigeria. NRI & FUNAAB have already identified a list of potential champions. Some of these businesses have been involved with NRI/FUNAAB as part of other projects, whilst others have been identified via an internet search and discussion with contacts in Nigeria. We aim to contact and visit as many of these organisations as possible during the visit. The preliminary list is as follows:

Fabricators
1. Capsfeed - Ibadan
2. Niji Lukas – Lagos (known to NRI/FUNAAB)
3. Nobex Industries – Lagos (known to NRI/FUNAAB)
4. Nucleus Ventures – Ibadan
5. Octec Technology - Lagos
6. Peak Products – Abeokuta (known to NRI/FUNAAB)
7. Techno-Quip – Lagos (we have seen flash dryers made by this company)

We have set aside Basicon – Owerri/Imo (known to NRI/FUNAAB) and Abiola Electrical & Machine Co – Osogbo/Osun as these are more distant from Ogun State.

Information platforms
FIIRO, IITA and universities such as FUNAAB all play an important role in providing information on cassava processing. However, we are also interested in private sector platforms operated via the internet. We have identified several of these but the most promising at this stage appears to be [www.smallstarter.com](http://www.smallstarter.com) which is operated from Lagos. We plan to arrange a meeting with the host of this website.

**Schedule of work**
The NRI/FUNAAB team intend to conduct the mission to Ogun State in the period between 14th September 2015 and 25th September 2015. NRI & FUNAAB will develop a more detailed work-plan which will guide us on logistical issues. However, it is likely that the team will operate mainly from Abeokuta but with some days in Lagos for meetings with fabricators and visits to Igbara for the case studies.

**Deliverables with timing**
The NRI/FUNAAB team will prepare a report of the findings from the mission, a draft of which will be made available by 9th October 2015, comments on the draft should be made within 10 working dates of receipt to allow the report to be finalised by mid-November 2015.

Dr A. Graffham – Natural Resources Institute
7th August 2015

1. Increasing Performance of the Cassava Industry in West and Central Africa Region (IPCI), 2015. Periodic Report #1, January to June 2015. NRI, SNV, FUNAAB. [↑](#footnote-ref-1)
2. Increasing Performance of the Cassava Industry in West and Central Africa Region (IPCI), 2015. Mission to Nigeria. Project Report. 21 April 2015 – 01 May 2015. Bennett, B., Graffham, A., Ogunyinka, O. [↑](#footnote-ref-2)
3. Discussions with Nobex, for example, showed that this manufacturer produces efficient gari fryers that are friendlier in use due to a smoke chimney/ventilation system. The manual fryer, which would be most relevant for the Agbelere (Bara) VPG, costs approximately N120,000 to build and install. Other fabricators may be able to provide similar quotes. [↑](#footnote-ref-3)
4. This figure is lower than the production costs calculated by VCDP, who indicated a figure of about N120,000/ha. Comparison of both calculations is necessary to understand the difference in these costs. [↑](#footnote-ref-4)
5. This yield seems to be high, considering the fact that most respondents stated that they did not apply any fertilisers or pesticides. However it could be possible – needs to be verified with VCDP agronomist. [↑](#footnote-ref-5)
6. This kind of yield is about the maximum obtainable for cassava production in Nigeria and seems very high for small-scale farming. Needs to be verified with VCDP agronomist. [↑](#footnote-ref-6)
7. Guilleminault, D., Sanni, L., Olaniyan, F., Njoku, D., Ehebhamen, F., et al. (2014). Niger Delta Cassava Industry Study. PIND, 2014. [↑](#footnote-ref-7)
8. 35 kg of gari will provide 28-29 ‘bowls’ of gari, which are sold at N100 each. [↑](#footnote-ref-8)