CSIR-FOOD RESEARCH INSTITUTE
(CSIR-FRI/RE/TC/2006/021)

CSIR-FRI/EU CASSAVA SME's PROJECT
Contract No: ICA-CT-2002-10006

REPORT ON TECHNOLOGY TRANSFER OF *FUFU* FLOUR TO TWO MICROSCALE *FUFU* PRODUCERS IN THE EASTERN AND VOLTA REGIONS OF GHANA

BY

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2006

ABSTRACT

Suhum in the Eastern Region and Sokode in the Volta Region are two popular rest stops on the Accra-Kumasi and Ho-Accra highways, respectively. Commuters using the two highways usually stop in these towns to patronize a number of restaurants where traditional *fufu* is the main dish. As part of the studies on the contribution of the cassava processing industry to the livelihood of farmers and artisanal processors under the EU/CSIR-FRI Cassava Project, qualitative data were collected from thirty members of the Traditional Caterers Association using a checklist to assess the contributions of *fufu* processing to their livelihoods at Suhum and Sokode. A focus group discussion was held to validate the findings. It was found that even though *fufu* processing contributes a lot to their incomes and therefore their standard of living, they face many constraints. Some of these constraints included availability and cost of cassava roots especially during the lean season, shortage of labour for *fufu* pounding, traditional ban on *fufu* pounding during annual festival of the people of Suhum and unsold pounded *fufu* at the end of the day among others. The study recommended the use of *fufu* flour as complement to traditional pounded *fufu* to reduce drudgery and wastage as well as lost of income caused by unsold pounded *fufu*. The concept of using *fufu* flour as a convenience form of the traditional *fufu* and the technology for its production were therefore transferred to these micro-scale *fufu* producers through a series of workshops and hands-on demonstrations. Impact studies conducted a year later showed some amount of adaptation.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

The Food Research Institute/European Union Cassava Small Scale Enterprise Project (FRI/EU Cassava SME's Project) project seeks to empower cassava SME's to add value to raw cassava through appropriate processing technologies in responses to the urban demands for value-added cassava products. The project has 8 specific and technological objectives as follows:

1. To develop and promote best practice guidelines for the commercialisation of traditional food products using cassava products as a model.
2. To develop and test specific technologies for the commercialisation of cassava based products.
3. To understand and optimise the impacts of commercialisation, specifically that based on SMEs, on the livelihoods of traditional processors.
4. To assess the potential of traditional processors to produce high quality products that meet urban demand.
5. Development of appropriate quality assurance (QA) systems for SMEs engaged in commercial processing of traditional foods products.
6. To develop more cost-effective and environmentally sensitive process that will make commercial manufactured cassava products more affordable
7. To establish ''best practices'' for the establishment, support and promotion of SME's producing traditional food products.
8. To examine and select marketing strategies and distribution systems which effectively target urban markets.

Fufu flours available are often prepared from either plantain or cocoyam or yam with addition of cassava. Plantain and yam *fufu* are sometimes eaten with light soup or pepper soup while cocoyam *fufu* is often eaten with *kontomire* soup (cocoyam leaves: *Xanthosoma sagittifolium*) popularly called *abunabun* or *green green* in Ghana. Pounded *fufu* is prepared by pounding boiled cassava with plantain, yam or cocoyam depending on the location of the consumers and access to the staple. That is, in areas where plantain is more available than yam or cocoyam, cassava is mainly mixed with

plantain. In other areas where plantain, yam or cocoyam is not common, the cassava is pounded without adding any of these staples. Pounded *fufu* is the most popular way of eating cassava in southern Ghana (Asiedu, 1989). There is an emerging market for a convenient form of the product that would not need pounding in the household prior to consumption. Gradual improvements in access to markets and the packaging of this product has extended its shelf life, thus market demand for *fufu* has been increasing (Adegeye, 1999).

Pounding of commercial *fufu* involves one person (sometimes a man) using the mortar to pound large lumps of cassava, with a woman turning the paste in the mortar. After pounding for a while, the man starts sweating and sweats profusely that he uses a towel to wipe off the sweat. From observations, some people perceive that some of the sweat ends up in the *fufu* paste. This perception prevents a lot of people patronising commercial *fufu* in the cities from eating the product. There is also drudgery as the only man pounding the *fufu* easily gets tired. But to earn a living, he continues with diminishing returns setting in as the process continues.

In order to address these specific and technological objects of the project a study was conducted at Suhum to assess the contributions of *fufu* processing to livelihoods of members of the Traditional Caterers Association. Their constraints included availability and cost of cassava roots during the lean season, access to credit, and shortage of labour for pounding *fufu*, traditional ban on *fufu* pounding during the annual festival of the people of Suhum and unsold pounded *fufu* at the end of the day among others. The study then recommended the use of *fufu* flour as a complement to traditional *fufu* to reduce drudgery and offset the shortage of labour for pounding. Hence, technology transfer on the preparation and utilization of FRI *fufu* flour and other *fufu* flours from Small and Medium Scale Enterprises (SME's) such as Neat, Ghanafresh, Rosafric, Tropiway, Elsa, Limex and Selasie on the local Ghanaian markets was undertaken at Suhum in the Eastern Region and Sokode in the Volta Region of Ghana. It was anticipated that the technology transferred will enhance the assimilation of the *fufu* flours into the operations of the micro-scale *fufu* producers to improve income generation.

CHAPTER 2

METHODOLOGY

2.1 Site selection

Suhum was selected for the study because of its position as a major rest stop on the Kumasi-Accra highway and also because of the concentration of *fufu* processors in the town (figure 1). The major cultivated crops are cassava, maize, plantain and vegetables. The *fufu* processors have organised themselves into the Traditional Caterers Association and have a total membership of forty five. This is unlike other places visited where there were no organised groups even though *fufu* processing is important.

Sokode is in the Ho District of the Volta Region of Ghana and is a rest stop on the Ho-Accra highway. Sokode is 10 km from Ho, the capital city of the Volta Region. The major cultivated crops are cassava and maize.

2.2 The population of study

The population is made up of micro-scale *fufu* producers pounding *fufu* for sale, alongside other food stuffs. The unit of analysis is the micro-scale *fufu* producer.

2.3 Sampling

Sampling was done with the members of the Traditional Caterers Association first, on Wealth ranking basis. A wealth ranking exercise was carried out with the members and it was realised that they categorised themselves into three major wealth groups Grandin (1988). These are the *Sikafour* (the rich), *Modenbofour* (those who are making more efforts to survive) and the *Ohiafour* (the poor). This finding is similar to Jeffries *et al.* (1997) who found five wealth groups in peri-urban areas of Kumasi.

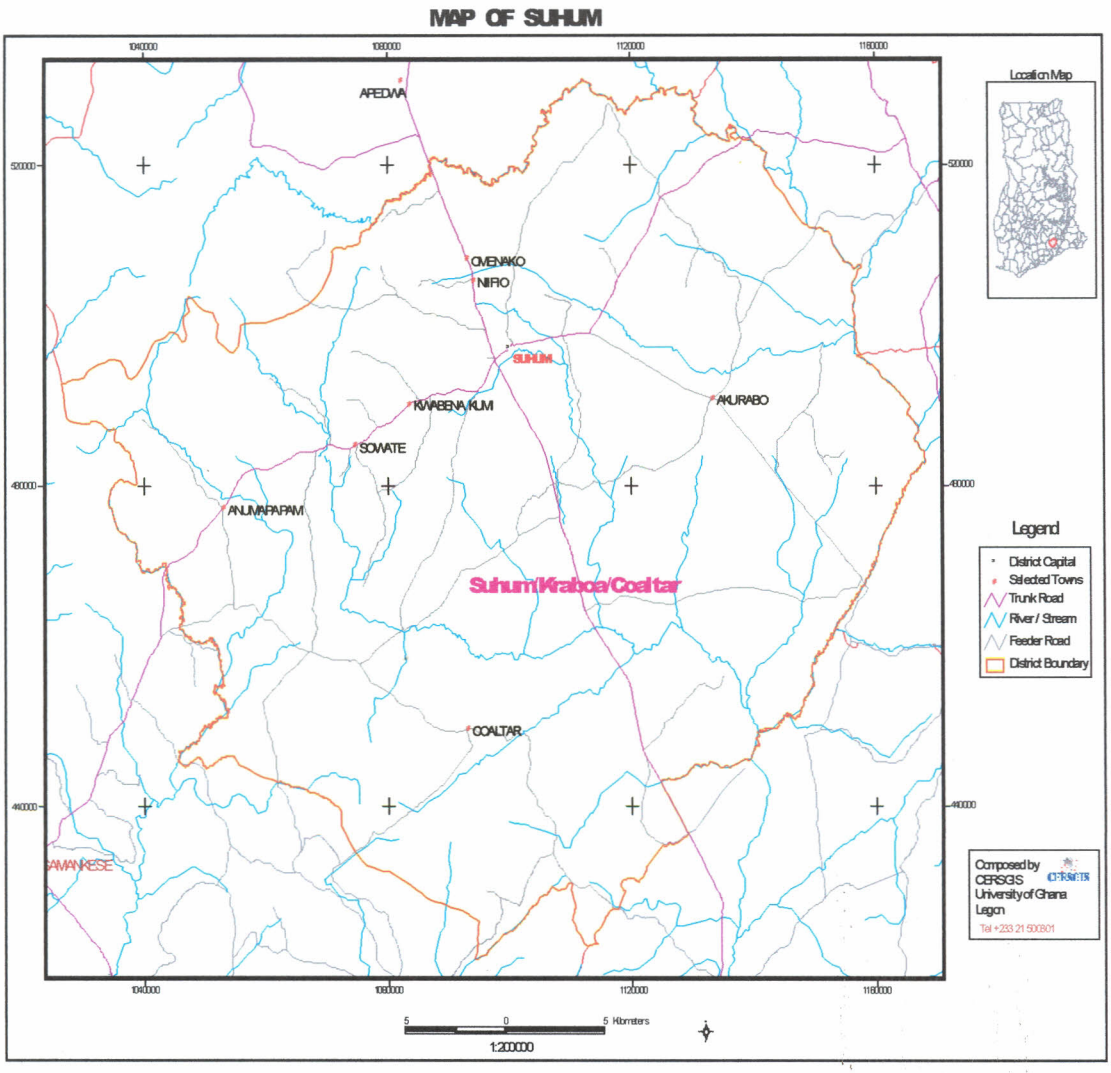

Figure 1. Map of Suhum

They observed that there were the very rich, rich, moderately rich, the poor and the very poor. In order to prevent the tendency to lean on the rich alone for results; the sampling included two of the three categories of wealth groups. After completing the ranking exercise, the members were asked to voluntarily group themselves into the three wealth groups identified. Unfortunately, they had only two groups, i.e. the *Modenbofour* and the *Ohiafour* and nobody was prepared to be declared a rich person. Not all the 45 members were present at the meeting. At an earlier meeting to introduce the research concept to them, there were only 25 members present and on the day of the wealth ranking, 18 members were present. The research team therefore decided to use the 18 members present and then with the assistance of the Secretary to

the Association, selected other 12 members based on the wealth groups, using the purposive method and their willingness to participate. The 18 members present divided themselves into the two wealth groups, with 12 going to the *Modenbofour* and 6 in the poor class. The purposive sampling gave us 8 more from the *Modenbofour* and 4 from the poor class. Therefore there were 30 respondents with 20 as the *Modenbofour* wealth group and 10 from the *Ohiafour* group.

2.4 Data collection instruments and data collection

The approach to the research was to collect qualitative data. In this case, a checklist was developed to carry out an in-depth analysis of the situation of *fufu* processors in the Suhum Township. The study was conducted over a two week period, covering all the 30 micro-scale *fufu* producers and finally, a Focus Group Discussion, involving 8 micro-scale *fufu* producers was held as a form of triangulation to validate the findings.

2.5 Technical staff

The technical staff that undertook the technology transfer for *fufu* flour was:

• Dr. P-N. T. Johnson	Food Post-harvest Specialist	FRI
• Dr. C. Tortoe	Microbiologist/Food Scientist	FRI
• Mr. B. A. Mensah	Food Technologist	FRI
• Ms C. Boateng	Nutritionist	FRI
• Mr. J. Anaglo	Agriculture Economist	UG
• Mr. E. T. Quayson	Food Scientist	UG

2.6 Technology transfer

The technology transfer for *fufu* flours was held at Suhum on 6th May 2006. The local members of Traditional Caterers Association were present. Those in attendance were 9 women and 4 men.

The technology transfer for *fufu* flours was held on 30th March and 5th July 2006 at Sokode with two micro-scale *fufu* producers selected based on their popularity in the town as there was no Traditional Caterers Association. These were Popular Chop Bar and Number One Chop Bar. On the first day of training, 8 and 12 employees from Popular Chop Bar and Number One Chop Bar respectively, participated in the training. The second day training was held at Popular Chop Bar for 14 and 10 employees from Popular Chop Bar and Number One Chop Bar, respectively.

Different *fufu* flour packages on the Ghanaian markets namely Neat, Ghanafresh, Rosafric, Tropiway, Elsa, Limex and Selasie were exhibited for trainees. Trainees were briefed on the background of how the companies got their protocols for the production, explaining that all the companies are invariably using what the Food Research Institute (FRI) of the Council for Scientific and Industrial Research (CSIR) has established through research conducted at its laboratories at the pilot plant. They were educated on the immerse benefits of adding *fufu* flour to their operations to improve their income as the *fufu* flour is available on the market, reasonable priced, easy and quick to prepare between 5-10 minutes. The various steps for preparing *fufu* flour were presented as in figure 2.

Step 1: Purchase raw plantain/cocoyam/yam

↓

Step 2: Sort by hand

↓

Step 3: Peel by hand

↓

Step 4: Wash in clean water and metabisulphate

↓

Step 5: Mechanical Slicing

↓

Step 6: Cook in boiling water

↓

Step 7: Spread on metal plates/polyethene to dry

↓

Step 8: Mill in a hammer mill

↓

Step 9: Add cassava starch

↓

Step 10: Package

↓

Step 11: Storage

↓

Step 12: Consumer

Figure 2. Flow chart for the production of *fufu* flour

Fufu preparation was done by measuring two cups of water and a cup of *fufu* flour and mixed together completely in a cooking bowl. The ratio of the flour to water is always 1:2. The mixture was cooked while stirring with a wooden ladle. The stirring continued into a thick smooth paste (5-10 minutes) at low heat. Additional water was added when desired to soften the paste. The resulting thick smooth paste was moulded into balls. The steps were demonstrated as in figure 3.

Step 1 Measure the flour with a receptacle (e.g. cup)

↓

Step 2 Add water twice the volume of the receptacle

↓

Step 3 Stir to make into slurry

↓

Step 4 Put on fire and stir till cooked

Figure 3. Flow chart for preparing *fufu*

Preparation of the flour into *fufu* takes approximately 10 - 15 minutes to cook. The trainees were made to demonstrate the knowledge acquired. Female trainees took turns to stir the paste as they were eager to have a feel of how the flour is turned into *fufu* ready for consumption. The second demonstration which used cocoyam *fufu* flour

had reduced water to flour ratio so that the *fufu* prepared came out relatively harder. The trainees were advised to use a little more water above the normal for cocoyam as is more in texture. The prepared *fufu* were served and ate by all with light soup provided by the team to make a proper comparison with the traditional prepared *fufu*. Their collated views are as presented in subsequent sections. Figure 4 to 7 shows the demonstration on preparing *fufu* and the trainees demonstrating the technology they have learnt.

Figure 4. Team member of FRI demonstrating the preparation of *fufu*

A. Trainee stirring cocoyam *fufu*

B. Trainee stirring plantain *fufu*

Figure 5(A,B). Trainees preparing *fufu*

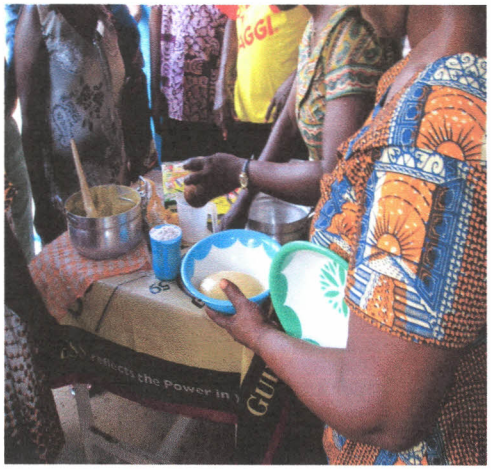

Figure 6. Moulding *fufu*

Figure 7. Trainees eating the prepared *fufu*

CHAPTER 3

RESULTS AND DISCUSSION

3.1 Demographic data

Background information reveals that both men and women were engaged in *fufu* processing as there were four micro-scale *fufu* producers operated by spouses. This is contrary to the Ghanaian belief that cassava processing is mainly a woman's job. Nweke (2004) had observed that men are increasingly involved in cassava production, processing and marketing as the cassava transformation unfolds in Africa. In Nigeria, Adebayo *et al.* (2004) noted that as traditionally "women" livelihood activities began to earn higher income, men venture into the activity. The rest were purely operated by women. Age of respondents ranged between 26 and 52 years. Processors were predominantly Christians with only 2% being Moslems. Even though Suhum is an Akan area, processing is mainly carried out by Akans, Ewes and Krobos.

While some respondents inherited the business from their parents, some entered at later stages as a livelihood activity. The educational background shows that only one person had secondary school education while 10% had Middle School Leaving certificate and the rest were either drop outs or had no formal education.

Processors had most of the physical capital required for the work. Almost 80% of them built their own premises for their operation while 20% live in rented premises where they pay an average of ¢80,000 (Eighty thousand cedis as rent per month, {$8.6}). Their main sources of energy were charcoal, gas, firewood and electricity but they use mainly charcoal and firewood. Electricity is not used by any of the respondents for cooking but used for ceiling fans, refrigerators and sound systems in their premises. In Suhum, there is pipe-borne water and bore-holes. Where the processors do not have their own pipes, they buy water at ¢30,000 per bucket ($ 3.2). Two of the respondents have their own means of transport which helps them in purchasing cassava from farmers and other commercial activities. The use of telephone is widespread among *fufu* processors as it facilitated their activities. Almost 60% of the respondents have mobile phones which are used to call orders for cassava

roots, meat and other resources they need for their operations. Those who do not have also use the commercial communication centres. Five of the micro-scale *fufu* producers had radio systems that provide music for customers as they enjoy their meals.

The most important characteristic observed with the *fufu* processors is the social capital. They were organised into an association called the Traditional Caterers Association (which is a branch of the Regional Association in the Eastern Region of Ghana) with a membership of 45. They meet on Wednesdays at 5.00 pm to discuss matters concerning their welfare and *fufu* processing. They have an appellation which is well known to all members. On meeting your colleague, you salute him/her *"Duani pa"* and the response is *"ema nkosuo" "ema aware so"*. That is, good food makes work to progress and also makes an interesting and everlasting marriage.

3.2 Constraints to fufu processing

3.2.1 Sources of credit

Fufu processing has contributed to the standard of living enjoyed by the members of the Traditional Caterers Association of Suhum. In their effort to make a living through *fufu* processing, they face a lot of challenges. According to the members, their major challenge is the source of credit for improvement in their activities. Access to credit facilities in the cassava processing industry was observed by Ayenor (1997). Some of the respondents indicated that they have assessed credit from the Mumuadu Rural Bank, South Akim Rural Bank and The First Ghana Building Society and private individuals acting as lenders. Interest rates were too high for them as these ranged between 30-40% in 2003-2005. The banks even required that they follow weekly re-payment schedules, which was difficult for them. As a result they stopped borrowing from the banks. With the private individual lenders, they charge interest rates of about 50% and sometimes start demanding re-payment before the agreed dates.

3.2.2 Availability of cassava roots

There is cassava shortage during the dry season when the land dries up and harvesting becomes a problem. Cassava has several uses hence competition for the roots for other products becomes a challenge. In South West Nigeria, non-availability of roots during the dry season was reported by Adebayo *et al.* (2004). This led to an increase in price of cassava and therefore an artificial shortage was created in the system. Processors had to travel to the villages in search of cassava farms and people who can uproot the cassava for purchases before they are able to process *fufu*. This led to higher transportation cost which actually increased their cost of production. Similar observation was reported by Graffham *et al.* (1999) when authors observed high costs of transportation in rural Ghana as a key constraint to commercial cassava marketing.

3.2.3 Labour

Cassava processing (e.g. *fufu* pounding) requires a lot of labour (UNIFEM, 1989) and according to the respondents, this is a major headache. *Fufu* pounding needs a lot of energy and it is usually done by one man while the woman turns the paste in the mortar. Due to the drudgery encountered, many *fufu* pounding men grow weaker over time and therefore look for other jobs elsewhere. This has made some of the micro-scale *fufu* producers to suspend activities for some time when the pounding men vacate their jobs. Sometimes the pounding men do not even give prior information as to their unavailability and it is when the cassava is being boiled that one may give excuse of ill-health or bereavement or other flimsy excuse which disturbs the micro-scale *fufu* producers activities all day. Another aspect of labour constraint is the use of family labour. Most people rely heavily on family labour which is not perceived as cost. They therefore do not know their actual returns in the business as they regard this labour as free.

3.2.4 Seasonality of consumption

During the end of the month and festive occasions respondents agreed they cash-in on very good sales. In the major farming season when most people in the area are

engaged in farming activities, consumption falls as the people spend the greater part of the day on their farms and only travellers patronise the micro-scale *fufu* producers at this time. Another seasonal effect is the Ramadan period of the Moslems. During the one month Ramadan period, *fufu* consumption decreases drastically and this affects their incomes as most drivers on the Kumasi-Accra highway do not stop over to take meals.

3.2.5 Taboos

The people of Suhum celebrate their annual *Odwira* festival in September and October. Suhum falls into two traditional zones – the Akyems and the Suhums. The Akyems celebrate the festival in September and the Suhums in October. During the festivities, two weeks are set aside for a ban on noise making including *fufu* pounding after 6.00 p.m. every day. In the second week, Tuesday is set aside for the Gods to enjoy their peace including a ban on noise making. This had affected *fufu* sales and consumption over the years. Fortunately, the Food Research Institute in collaboration with the Department of Agricultural Extension of the University of Ghana introduction of the use of *fufu* flour as a complement to traditional *fufu* to help curtailed this problem. The technology transfer of *fufu* flour was appreciated so much as it helped improved the livelihood of the micro-scale *fufu* processors.

3.2.6 Poor record keeping

The research has shown that none of the processors kept records. At first it was thought that the respondents did not want to expose their accounts to outsiders but after the Focus Group Discussion, it became evident they do not keep written records. They only have an imaginative record of their daily activities.

3.3 Technology transfer

Trainees were concerned about the shelf-life of the *fufu* after it is prepared. *Fufu* prepared from the flour can be kept for all day and could be subjected to the same

conditions as that of traditional *fufu*. A trainee asked if she could prepare the *fufu* in large quantities and dispenses using mortar and pestle as it pertains in the traditional *fufu* vending. *Fufu* preparation in large quantities is possible when customers are at hand to purchase, however it would take relatively longer time for preparation. The group was very impressed with the technology and wanted very much to know how they could get the flour. Arrangement with *fufu* flour producing companies was agreed as the best approach to obtain the flour in large quantities.

When the participants were asked about the potential benefits they perceive they would derive if *fufu* flour was adopted, they mentioned the following;

- It will lead to increased profit
- Reduced hire of labourers
- Elimination of the difficulty in getting labourers to pound

When they were asked about the possible unemployment for the pounding men that the adoption of the *fufu* flour would cause, the participants said such labourers will find alternative jobs such as turning the paste when on fire and getting the meat dressed at the slaughter house. On how they could get the customers to develop a taste for the *fufu*, trainee agreed on provision of the two types of *fufu* and asking the customers to choose between the two would help to develop the taste for the *fufu* flour. Trainees were concerned about the taste, smoothness, hand-feel and mouth-feel of the *fufu* flour if it compares favourably to the traditional prepared *fufu*. After the technology transfer trainees agreed on the excellent results on all attributes mentioned of the *fufu* flour.

3.4 Lessons learnt during the technology transfer

- Trainees embraced the technology transfer and introduced *fufu* flour into their micro-scale *fufu* producers operations
- They anticipated increased in their income after the technology transfer.
- Trainees were unaware of the *fufu* flours on the markets.
- They agreed that the quality of the *fufu* especially the taste was better that the traditional *fufu*.
- The source of regular supply and the cost of the *fufu* flour were of concern to the trainees.

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The activities of the *fufu* processors had helped improved livelihoods and help society with dietary requirements. Financial capital is a necessary requirement in all business activities. At Suhum *fufu* processors are already organised into a very strong association and should be able to access loans at the banks. At Sokode *fufu* processors were encouraged to form an association and apply for credit as a group so that people can be held jointly and severally in case of default. Micro-scale *fufu* processors accepted *fufu* flour as a complement to the traditional *fufu* in their operations. This can solve problems of cassava availability and high cost and lack of labour for *fufu* pounding among others. The producers of the *fufu* flour should consider cheaper packaging for the Ghanaian market alongside packages for the middle class and Ghanaians living abroad. General, trainees were very happy for the simple reason that the technology transferred would help them to be in business throughout the year.

4.2 Recommendations

The *fufu* processors should arrange with Non Governmental Organizations involved in group training to have more training on record keeping and access credit facilities and other social benefits. The technology should be extended to the towns requested by trainees namely Nsawam, Koforidua, Nkawkaw, Adeaso and Bonsu all in the Eastern Region. Information on consumer utilization, acceptability, preference and perception of *fufu* flours in the operations of the micro-scale *fufu* producers should be documented for further studies.

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