

**CSIR-FRI/RE/KGA/2009/018**



**C:AVA PROJECT**

**FIRST SIX MONTH REPORT (MARCH TO AUGUST 2009)**

**Gregory A. Komlaga and Mary Glover-Amengor**



**CSIR-FOOD RESEARCH INSTITUTE**

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**GREGORY A. KOMLAGA AND MARY GLOVER-AMENGOR**

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**OBJECTIVE 1: STRENGTHEN CAPACITY OF COMMUNITY PROCESSING GROUPS**  
**(SMALL SCALE PROCESSORS)**

**1.1 INTRODUCTION**

One of the objectives of the CSIR-Food Research Institute C:AVAProject is to strengthen the capacity of community processing groups (small scale processors) in the production of High Quality Cassava Flour (HQCF). In order to meet this objective the CSIR-FRI Team first collected three manuals on HQCF production and updated them in order to use them to train processing groups in the BrongAhafo and Volta Regions. The manuals were (a) Training Manual For the Production of High Quality Cassava Flour, a CSIR-FRI, Natural Resources Institute (NRI) and National Board for Small Scale Industries (NBSSI) manual, (b) Cassava Processing in Ghana: an Information Guide, a Root and Tuber Improvement and Marketing Project (RTIP) booklet, and Making High-Quality Cassava Flour, a CTA Practical Guide Series No. 5. The CSIR-FRI Team also carried out four training activities in the BrongAhafo and Volta Regions between 21<sup>st</sup> April and 1<sup>st</sup> September 2009.

**1.2 UPDATING TRAINING MANUALS ON HQCF**

The three manuals were thoroughly examined and reviewed in order to produce the manual to be used by the CSIR-FRI Team for the training of the groups identified in the BrongAhafo and Volta Regions. One hundred copies of the manuals are being printed for distribution to the groups.

**1.3 CAPACITY STRENGTHENING (TRAINING)**

**1.3.1 ATEBUBU DISTRICT (BRONG AHAFO REGION)**

The first training on HQCF production for farmers/farmer-processors in the Atebubu District was carried out between 21<sup>st</sup> and 25<sup>th</sup> April 2009. The Christ Apostolic Agency for Relief and Development (CAARD), an NGO based in Atebubu linked the CSIR-FRI Team to the Communities. Two officials of CAARD who facilitated the linkage to the communities were Mr. Samuel Nash Ansah (Project Coordinator) and Mr. Jagiri Musah (Programme Advisor). The communities visited were Kunfie, Fakwesi, Bompa, Mosi-Mosi and Old Konkrompe.

The FRI Training Team first interacted with all farmers/farmer-processors in the communities in order to know their extent of knowledge on HQCF production and equipment requirements. All the farmers/farmer-processors in the communities were trained except those in Fakwesi, where only discussions on HQCF production were carried out.

#### **1.3.1.1 Kumfie**

There are three groups namely Kumfie I, II and III. Those trained in this community were mainly farmer-processors. Each group was made up of a minimum of 25 members who are predominantly females. The farmer-processors in the groups owned the cassava farms where the crop is mainly processed into *gari*. In all 30 members comprising 28 females and 2 males were trained in this community. The community had basic processing facility for *gari* namely a peeling site, a grater, a screw press and a disc attrition mill.

#### **1.3.1.2 Bompa**

There are 2 groups: Bompa I and II. The members are farmer-processors who process cassava into *gari*. There are 30 members in each of the groups. Altogether, 14 males and 18 females were trained on HQCF production. There is a basic processing facility for *gari* namely a peeling site, a drying patio, a grater, screw press and disc attrition mill.

#### **1.3.1.3 Mosi-Mosi**

There are 5 groups totalling 200 members; i.e. 30 or more members in a group. The members are basically farmers but want to take up processing of HQCF. In all, twenty-one (21) males and nine (9) females were trained on HQCF production. The community had basic processing facility for *gari* i.e. a peeling site, a drying patio, a grater, screw press and disc attrition mill. They have a big drying patio of about 20 x 20 ft dimension.

#### **1.3.1.4 Old Konkrompe**

There is only one group in this community made up of 23 females and 5 males. The members are mainly farmer-processors. Ten (10) males and nine (9) females were trained. The community had basic processing facility for *gari* production namely a peeling site, a grater, screw-press and disc attrition mill.

### **1.3.2 HOHOE DISTRICT (VOLTA REGION)**

A second training was carried out in the Hohoe District of the Volta Region between 4<sup>th</sup> and 8<sup>th</sup> May, 2009. The Christian Rural Aid Network (CRAN), an NGO based in Hohoe linked the CSIR-FRI Team to the Communities. Two officials of CRAN who facilitated the linkage to the communities were Mr. Samuel Asior (Project Coordinator) and Mr. Sebastian Agbodzi (Programme Advisor).

In all, farmers and farmer-processors in nine (9) communities were successfully trained on how to process cassava into HQCF. Three communities were trained per day. On the first working day the

team had an interaction/discussion with all nine communities. Their processing facilities were assessed and respective training days and times arranged. On the second day of training a screw press was acquired from CRAN to facilitate the demonstration of the processing of HQCF because it was observed that none of the nine communities had a press. The communities visited were TafiAtome, LogbaAlapketi, VeKoloenu, LiatiDafonu, Gbi-Kodzofe, Lipe-Nkwanta, LikpeAlavanyo, Likpe-Bakua and Fodome-Amle.

Two more trainings were carried out in the Hohoe District in the Volta Region between 18<sup>th</sup> to 21<sup>st</sup> August and from 25<sup>th</sup> August to 1<sup>st</sup> September, 2009. CRAN again linked the CSIR-FRI Team to the Communities. Three officials of CRAN who facilitated the linkage to the communities were Mr. Sebastian Agbodzi (CRAN worker), Mr. Constance Nelson Gbeddi (Technical Officer for Hohoe North) and Mr. Emmanuel Ayema (Technical Officer for Hohoe South). All communities consist of both farmers and processors with at least two groups in each community. Those groups that have their executives and some basic equipment in place were given loans facility and specific dates when their mash would be picked for drying.

The communities in which the training was carried out were LikpeTodome, LikpeKpodzi, LikpeNkonta, FodomeHelu, GbiWegbe, FodomeKodzeto, NyagboGagbefe, Have Etoe, Agate, Teikrom, VeKoloenu Ando, GoviefeandKpeveTornu.

#### **1.3.2.1 TafiAtome**

There were two (2) groups in this community comprising 25 and 40 members, respectively and were all farmer-processors. Forty nine (49) members made up of 27 females and 22 males were trained.

#### **1.3.2.2 LogbaAlakpeti**

The name of the group in this community is *Nukomeko*. Twenty nine (29) members made up of 18 females and 11 men of this community were trained.

#### **1.3.2.3 Ve-Koloenu**

The group in this community was not yet formed but 9 potential members (5 men, 4 women) were trained. The building that housed the processing equipment was found to be fairly acceptable but needed to be cleaned.

#### **1.3.2.4 Gbi-Kodzofe**

This community had 2 groups. Group 1 consisted of 23 members (11 men, 12 women) and Group 2 was made up of 35 members (12 men, 23 women). Altogether, 25 members (8 men, 17 women) were successfully trained.

#### **1.3.2.5 LikpeAlavanyo**

This is the only community where members owned and managed the processing facility. Twenty-five (25) members comprising 12 women and 13 men were trained.

#### **1.3.2.6 LikpeBakua**

The group in this community is known as *Kakadedzi* Cassava Processing Group. In all 14 members (comprising 6 men and 8 women) were trained.

#### **1.3.2.7 FodomeAmle**

This community had the largest number of members in all the groups visited. There were two groups with 60 and 63 members, respectively. A total number of 74 members (comprising 12 men and 62 women) from the two groups were trained. These groups in this community also produce palm kernel oil as well as *gari* and *agbelima*.

#### **1.3.2.8 Liati-Dafonu**

Group formation in this community was in progress and 25 members (11 men, 14 women) were successfully trained.

#### **1.3.2.9 LikpeNkwanta**

Group formation in this community was also in progress. Sixteen (16) members comprising 9 women and 7 men were trained.

#### **1.3.2.10 LikpeTodome**

The group in this community is known as *Foebobude* and consists of both farmers and processors. In all, 41 members comprising sixteen (16) males and twenty five (25) females were trained on HQCF production. The members of this group had no previous knowledge on HQCF production.

#### **1.3.2.11 LikpeNkonta-Kpodzi**

The name of the group in this community is *Norvisi*. Thirty one (31) members comprising thirteen (13) males and eighteen (18) females were trained. Two of the members had previous knowledge of cassava flour production which was taught them by a certain Non-Governmental Organization.

#### **1.3.2.12 FodomeHelu**

The group in this community is called *Butsomekpor*. The members consist of both farmers and processors. In all, forty five (45) members comprising twenty five (25) males and twenty (20) females were trained on HQCF production. The members of this group had no previous knowledge of HQCF production and lacked a screw press.

#### **1.3.2.13 GbiWegbe**

The group known as GbiWegbe Multipurpose consists of both farmers and processors. In all, fifty (50) members comprising twenty five (25) males and twenty five (25) females were trained on HQCF production. The processors in the group have been assisted with a loan facility by CRAN to acquire three screw presses and also purchase cassava for the wet mash. The members of this group had previously been trained by the CRAN and have started production of HQCF due to their proximity to the intermediary's drying facility. Though the community is currently using an old milling site for cassava mash processing, their new site which is well equipped is almost ready for use.

#### **1.3.2.14 FodomeKodzeto**

The community consists of both farmers and processors. No group is yet formed. In all, forty eight (48) of the community members comprising eighteen (18) males and thirty (30) females were trained on HQCF production. The members of this group had no previous knowledge of HQCF production.

#### **1.3.2.15 NyagboGagbefe**

The members of this community are mainly settler farmers settlers from the Northern part of the country and are mainly *agbelima* processors. Twenty three (23) farmers comprising of sixteen (16) males and seven (7) females from a group known as *Norvisi* were trained. This group does not have screw press and are yet to secure a loan for the equipment and purchasing of the mash.

#### **1.3.2.16 Have Etoe**

The *Dzidefo* and *Dormenyogroups* in the community are made up of both farmers and processors. Total members present for training were thirty (30) comprising seventeen (17) males and thirteen (13) females. They have all the facilities for processing HQCF except screw press but have no previous knowledge of HQCF production.

#### **1.3.2.17 Agate**

The group is called *Dzigbodi*. It is the most organized and most receptive farmer and processor group. They have clean and well housed equipment though they lack a screw press. The members had no previous knowledge of HQCF production but are eager to secure a loan from CRAN for production to start.

#### **1.3.2.18 Teikrom**

The people in this community have not yet formed their group but have the largest attendance for the training. In all, seventy eight (78) farmers and processors, comprising thirty three (33) males and forty five (45) females took part in the training. None of the trainees had previous knowledge of HQCF production. Though they have basic processing facility they lack a screw press.

#### **1.3.2.19 VeKoloenu Ando**

The members of this group, called *Norvisi*, have the equipment and loan to start production. Being their market day, only a few members of the group, i.e. thirteen (13) males and six (6) females took part in the training. None of the members had previous knowledge of HQCF production.

#### **1.3.2.20 Goviefe**

The group in this community is yet to be well established. In all, forty four (44) comprising twenty males (20) and twenty four (24) females took part in the training. The group has all the basic facilities for processing except a screw press. They had no previous knowledge of HQCF production.

#### **1.3.2.21 KpeveTornu**

The members of this community are both farmer-processors and fishermen. In all, fifty eight members comprising thirty (30) males and twenty eight (28) females were trained in HQCF production. They had basic processing facilities except screw press and had no previous knowledge of HQCF production.

### **1.3.3 GENERAL OBSERVATIONS**

None of the groups trained in the BrongAhafo Region, had any knowledge of HQCF and/or its production. They had little or no knowledge of GMP and personal hygiene. All the groups trained also lacked the following basic equipment: weighing scales, stainless steel knives, washing troughs. In addition they also did not have any effluent disposal system, relatively large drying patios to cater for at least 80% of their members if dried grits would be required from them, and black plastic sheets for sun-drying the wet mash. With the exception of Old Konkrompe that had a bore-hole, all the other communities used water from river for processing HQCF.

For the groups trained in Hohoe District of the Volta region, most of the buildings that housed the processing equipment need to be renovated/refurbished. None of the groups trained had any knowledge of HQCF and/or its production. They had little or no knowledge of GMP and personal hygiene. In the communities where most of the groups are located there is a good source of drinking water for processing of HQCF. All the groups trained also lacked the following: screw presses, weighing scales, washing troughs, effluent disposal system, drying patios and black plastic sheets. Since they are *agbelima* producers they have basic processing facilities for production of *agbelima* namely: a peeling site, a grater and a disc attrition mill.

### **1.3.4 CONCERNS OF THE FARMERS/FARMER PROCESSORS**

In nearly all the communities, farmers wanted to be assured that once they produce HQCF, an intermediary would always be present to buy at a good price. They also wished to have loan facilities to purchase production equipment and also increase farm acreage. Some farmers wanted to know if the project had the capacity to provide them with farming inputs such as planting material, fertilizer and other agrochemicals. Processors also wanted to know if screw-presses would be provided to the communities to promote HQCF production. Since the price of cassava is seasonal and the price fluctuates in the year the processors were wondering if they would be allowed to fix the price of the mash they would sell to intermediaries.

### 1.3.5 CONCLUSIONS

Farmers and farmer-processors in all the groups that were trained shared information, knowledge and techniques, worked together in groups to solve problems, assessed all components of their intended HQCF processing business in order to make the business more productive and profitable. They discussed production, management, marketing and land management issues among themselves and became better informed and in control of decisions relating to the business. Because of the new emerging HQCF market, changes were made to business structures and/or diversification. FBO members became empowered to make strategic business decisions. Changes were made to improve communication within the family/farm/network and in relation to other human resource issues and to investment in environmental or natural resource management.

The total number of farmers/processors/farmer-processors in the Atebubu District (BrongAhafo District) and Hohoe District (Volta Region) is shown in Tables 1 and 2, respectively.

**Table 1: Total number farmers/processors/farmer-processors trained in Atebubu District (Brong Ahafo District)**

Community	Status	No. of Women	No. of Men
Kunfie	Farmer-Processors	28	2
Bompa	Farmer-Processors	18	14
MosiMosi	Farmers	9	21
Old Kokrompe	Farmer-Processors	9	10
<b>Total no. of Farmer-Processors trained</b>		<b>55</b>	<b>26</b>
<b>Total no. of Farmers Trained</b>		<b>9</b>	<b>21</b>
<b>Total Trained</b>		<b>64</b>	<b>47</b>

**Table 2: Total number farmers/processors/farmer-processors trained in Hohoe District (Volta Region)**

Community	Status	No. of Women	No. of Men
TafiAtome	Farmers/Processors/Farmer-Processors	27	22
LogbaAlakpeti	Farmers/Processors/Farmer-Processors	18	11
Ve-Koloenu	Farmers/Processors/Farmer-Processors	4	5
Gbi-Kodzofe	Farmers/Processors/Farmer-Processors	17	8
LikpeAlavanyo	Farmers/Processors/Farmer-Processors	12	13
LikpeBakua	Farmers/Processors/ Farmers-Processors	8	6
LikpeNkwanta	Farmers/Processors/Farmer-Processors	9	7
FodomeAmle	Farmers/Processors/Farmer-Processors	62	8
Liati-Dafonu	Farmers/Processors/Farmer-Processors	14	11
LikpeTodome	Farmers/Processors/Farmer-Processors	25	16
LikpeNkonta-Kpodzi	Farmers/Processors/Farmer-Processors	18	13
FodomeHelu	Farmers/Processors/Farmer-Processors	20	23
GbiWegbe	Farmers/Processors/Farmer-Processors	25	25
FodomeKodzeto	Farmers/Processors/Farmer-Processors	30	18
NyagboGagbefe	Farmers/Processors/Farmer-Processors	7	16
Have Etoe	Farmers/Processors/Farmer-Processors	13	17
Agate	Farmers/Processors/Farmer-Processors	15	22
Teikrom	Farmers/Processors/Farmer-Processors	45	33
VeKoloenu Ando	Farmers/Processors/Farmer-Processors	6	13
Gaviefe	Farmers/Processors/Farmer-Processors	24	20
KpeveTornu	Farmers/Processors/Farmer-Processors	28	30
<b>Total no. of Farmer-Processors trained</b>		<b>286</b>	<b>126</b>
<b>Total no. of Farmers Trained</b>		<b>141</b>	<b>111</b>
<b>Total Trained</b>		<b>427</b>	<b>337</b>

## **OBJECTIVE 2: STRENGTHEN THE CAPACITY OF MEDIUM TO LARGE SCALE PROCESSORS OF HIGH QUALITY CASSAVA FLOUR (HQCF)**

### **2.1 INTRODUCTION**

The second objective of the CSIR-Food Research Institute C:AVA Project is to strengthen the capacity of medium to large scale processors (40% women) with relevant skills to effectively and efficiently employ Good Manufacturing Practices and Quality Management Systems to profitably process and deliver 15.68 and 47.04 tons per month per medium and large scale processor respectively of High Quality Cassava Flour (HQCF). In order to achieve this objective, the CSIR-FRI first conducted a Training Needs Assessment in the Volta, BrongAhafo and Greater Accra Regions from 4<sup>th</sup> to 21<sup>st</sup> May, 2009. After the Training Need Assessment, training manuals on HQCF were updated. Five available HQCF training manuals were used for the update. The manuals were (a) Training Manual For the Production of High Quality Cassava Flour, a CSIR-FRI, Natural Resources Institute (NRI), (b) Study of Quality Management Systems for Cassava Value-chains in Ghana, (c) Cassava Processing in Ghana: an Information Guide, a Root and Tuber Improvement and Marketing Project (RTIP) booklet, (d) Making High-Quality Cassava Flour, a CTA Practical Guide Series No. 5 and (e) Quality Management Manual for Production of High Quality Cassava Flour. The CSIR-FRI is presently carrying out the initial technical training on HQCF from the 15<sup>th</sup> September to 6<sup>th</sup> October 2009 in the Volta, BrongAhafo and Greater Accra Regions.

### **2.2 UPDATING TRAINING MANUALS ON HQCF**

Five training manuals on HQCF were thoroughly examined and reviewed in order to update the manuals to be used by the CSIR-FRI Team for the training of the identified medium to large scale processors in the Volta, BrongAhafo and Greater Accra Regions. Two training manuals on HQCF were produced. These were: (1) Training Manual for the Production, Quality Control and Sanitation Management of HQCF (2) Product Specification for Cassava Roots, Cassava Wet Cake and High Quality Cassava Flour for Small and Intermediary Cassava Processors. Forty copies each of the manuals have been printed and are being used and given out as training hand-outs to the trained medium to large scale processors.

### **2.3 TRAINING NEEDS ASSESSMENT**

#### **2.3.1 HO AND HOHOE DISTRICTS (VOLTA REGION)**

Training Needs Assessment was conducted from the 4<sup>th</sup> to 6<sup>th</sup> May 2009 for four selected medium to large scale processors in the Volta Region of Ghana. The processors visited were Marbert Limited, Caltech Ventures, God's Way Enterprise and Majestic Agribusiness Centre.

##### **2.3.1.1 Marbert Limited**

Marbert Limited is a registered limited liability company located at Akrofu-Xeviope, which is about 10 Km from Sokode-Gbogame and is off the Accra-Ho highway. It has been in existence since 2004.

Marbert Limited has eight employees, two men and six women and contracts ten casual women peelers on demand.

#### **2.3.1.2 Caltech Ventures**

Caltech Ventures is a registered limited liability company located at Ho-Hodzo. It has been in existence since 2006. The company has 250 employees including 120 females and 130 males out of which 80 are permanent workers. The company often employs 30 female peelers and 20 farm workers as casual hands. Caltech Ventures is involved in cassava plant multiplication, farming and processing. Presently, it has 1,600 acres cassava plantation. The company is installing additional modern cassava processing plant for the production of HQCF.

#### **2.3.1.3 God's Way Enterprise**

God's Way Enterprise is a registered limited liability company located at Agate, Have. It has been in existence for the past 11 years. The company has six permanent workers comprising of three males and three females. The company's major product is composite biscuit of 50% cassava flour and 50% wheat flour. It also produces HQCF grits and *agbelima* flour. God's Way Enterprise activities are supported by a group known as Tonyeli Women Development Association. God's Way Enterprise buys cassava grits from Tonyeli Women Development Association and processes into HQCF for biscuit production. Tonyeli Women Development Association is a farming group which also processes *agbelimagrits* and grits for HQCF production. Tonyeli Women Development Association has 32 women consisting of two groups. God's Way had acquired a loan from CDRDP to build a new processing plant which is uncompleted.

#### **2.3.1.4 Majestic Agribusiness Centre**

Majestic Agribusiness Centre is a registered non-governmental organization located at Hohoe. It has been in existence since 2007. It was originally set up to process dried ginger for export and dried maize seeds for farmers. The centre supplies maize seeds to Ho, Kumasi and Accra. The company is now preparing for processing HQCF from pressed cake obtained from farmer processors. Majestic Agribusiness Centre has ten employees and four casual and intends to process six times in a week. The centre has eight acre cassava farm.

### **2.3.2 CHIRAA, DUAYAW NKWANTA AND ATEBUBU DISTRICTS(BRONG AHAFO REGION)**

Training Needs Assessment was conducted at three selected medium to large scale processing sites in the BrongAhafo Region of Ghana from 12<sup>th</sup> to 16<sup>th</sup> May, 2009. The three selected sites visited were Cassacoxa Limited located at Chiraa, Bredi Agricultural Enterprise located at Bredi and 1<sup>st</sup> Door Farms located at Atebubu.

#### **2.3.2.1 Cassacoxa Limited**

Cassacoxa Limited is a registered liability company located at Chiraa which is 25km from Sunyani on the Sunyani-Techniman highway. It was established in 2007 as a cassava processing plant to produce High Quality Cassava Flour (HQCF) for the plywood industries and additional processing into ethanol. The company has six permanent employees with 12 casual female workers.

#### **2.3.2.2 Bredi Agricultural Enterprise**

Bredi Agricultural Enterprise is a limited liability company located at Bredi near Duayaw-Nkwanta in the BrongAhafo Region. It had been in existence since 2006. The company had six permanent employees with four women and eight casual workers for harvesting and peeling. The company had 85 acre cassava farm ranging from 12, 18 and 24 months.

#### **2.3.2.3 1<sup>st</sup> Door Agro-Processing Enterprise**

1<sup>ST</sup> Door Agro-processing Enterprise was originally set up for shea butter processing but presently processing HQCF since 2007. It employs 15 permanent workers, with six men and nine women. The company owns a cassava processing plant at Watro, 15 km from Atebubu. 1<sup>ST</sup> Door Agro-processing Enterprise owns a 21 acre cassava farm. However, it had stopped processing HQCF for the past three months.

### **2.3.3 GA-RURAL DISTRICT (GREATER ACCRA REGION)**

#### **2.3.3.1 Amasa Agro-Processing Company**

Amasa Agro-processing Company is a registered liability company located at AyikaiDoblo in the Greater Accra Region. It was established in 2002 as a cassava processing plant to produce High Quality Cassava Flour (HQCF) for the plywood industries and other cassava products like *gari* etc. The company has six permanent employees with 18 casual workers which include eight females. The company is setting up a modern cassava processing plant at Nkenken in the Afram Plains of the Eastern Region. It has acquired a four mile square cassava plantation to supply fresh cassava to the processing plant at Nkenken.

#### **2.3.3.2 Afrimat Global Enterprise Limited**

Afrimat Global Enterprise Limited is a limited liability company located at Fise in the Greater Accra Region. It was initially established for the production of Vitamix (cereal-weaning foods). From 2006, Afrimat Global Enterprise Limited started the production of glucose syrup from HQCF. The company has 22 permanent employees with 15 women and 10 female casual workers for harvesting and peeling of cassava. The company has a three acre cassava farm.

### **2.4 CAPACITY STRENGTHENING (INITIAL TECHNICAL TRAINING ON HQCF PRODUCTION) – HO AND HOHOE DISTRICTS (VOLTA REGION)**

The initial technical training on High Quality Cassava Flour (HQCF) was carried out from 16<sup>th</sup> to 24<sup>th</sup> September, 2009. This training was based on the Training Needs Assessment carried out from 4<sup>th</sup> to 6<sup>th</sup> May 2009 for four medium and large-scale cassava processors. The four cassava processors were: Marbert Limited located at Akrofu-Xeviope, Caltech Ventures located at Ho-Hodzo, GodswayEnterprise located at Agate-Have and Majestic Agribusiness Centre located at Hohoe. The training was based on a training plan for each processing site. The initial technical training on HQCF is a requisite for Objective 2 which stipulates that by March 2010 at least ten medium to large scale processors (40% women) are strengthened with relevant skills to effectively and efficiently employ Good Manufacturing Practices and Quality Management Systems to profitably process and deliver 15.68 and 47.04 tons per month per medium and large scale processors respectively of HQCF. The method of training included presentations, teaching and hands on demonstration on all the unit operations.

Each processor was trained for two days. Day 1 training was: Introduction to HQCF, its uses, requirement for its production and work ethics. This was followed by demonstration on unit operations for processing HQCF: selection of raw materials, peeling, washing, grating, dewatering, disintegration, drying, milling, sifting and packaging. Further training included equipment operation and maintenance, sources of quality equipment and proper records keeping. Day 2 training was on analytical methods for quality control including training on quality requirements for receipt of wet cake (moisture, taste and smell, colour, microbiological analysis, acidity, pH, extraneous matter, starch, average particle size, pasting temperature, cook paste viscosity and other factors impacting on quality. The training was concluded by conducting an evaluation of the training.

## **2.4.1 TRAINING**

### **2.4.1.1 Caltech Ventures**

Ten supervisors from the various operational sections of Caltech Ventures were trained. The sections were: (a) farm, (b) flour production, (c) *gari* and dough, (d) field, (e) factory hands (peélers), (f) security and (g) operations. The supervisors were supposed to disseminate the knowledge acquired to their subordinates after the training. This arrangement was done in order not to interrupt the working schedules of Caltech Ventures. Caltech Ventures is involved in cassava plant multiplication, farming and processing. The company has installed a state-of-the-art processing plant which produces 1.5 tonnes of HQCF daily. The company has all the basic processing facilities for cassava processing namely graters, screw presses, hammer mill, a disc attrition mill, a bin dryer and a sifter. The strategy developed with Caltech Ventures was to process 2.5 tonnes of raw cassava into 0.5 tonnes HQCF to supplement the 1.5 tonnes of HQCF per day from the state-of-art processing plant (using flash dryer).

### **2.4.1.2 Godsway Enterprise**

The initial technical training on HQCF was conducted for 32 members from Godsway Enterprise and Tonyeli Women Development Association. Tonyeli Women Development Association is a farmer–processor processing cassava into HQCF. There were 8 males and 24 females who were trained on HQCF production. Godsway Enterprise owns a cassava grater, two cassava presses, one electricity gas bin mechanical dryer, one disc attrition mill and one charcoal oven for baking biscuits. The enterprise is currently constructing a new processing plant which is yet to be completed. In view of the capacity of the dryer, Godsway Enterprise is strategized to process 2.0 tonnes of raw cassava per two shifts until the new processing plant is completed.

#### **2.4.1.3 Majestic Agribusiness Centre**

The initial technical training on HQCF was conducted for 9 members from Majestic Agribusiness Centre. There were 2 females and 7 males. The centre was trained on HQCF production and the quality requirement for pressed cake as the company was scheduled to receive and process pressed cake into HQCF from farmer processors in the villages surrounding it. Currently Majestic Agribusiness Centre owns a press, a grater, a bin dryer and a hammer mill. In view of the equipment present, two strategic plans were developed and discussed. The first was to receive a total of 2.5 tonnes pressed cake twice daily with a moisture content of 40-45% for drying in two shift batches. The second strategy was to acquire an additional dryer of 2.5 tonnes capacity to facilitate the drying of 5.0 tonnes pressed cake for one shift.

### **2.5 GENERAL OBSERVATIONS**

During the Training Needs Assessment it was observed that most of the medium to large scale processors had no work plan for daily activities. Amasa agro-processing company and Afrimat Global Enterprise Limited were the only processors having a laid-down work plan for daily activities. Hygienic conditions on most of the premises visited were not up to standard. For example, there were no working gear, head gear, nose mask and changing rooms. Some of the processors had inadequate processing halls and stores. At Marbert Limited, the drying of cassava grits was done on black polyethylene sheets on the ground, which could lead to product contamination. Caltech Ventures was installing state-of-the-art cassava processing plant. The work force of the Caltech Ventures comprised of primary, secondary and tertiary educational level employees. All the processors did not have an efficient effluent disposal. God's Way Enterprise's new processing plant was sited on a hill with a steep slope which will make it difficult for the supply of raw materials and carting of finished products.

The observation made during the initial technical training suggested that the processors were conscious of their short-comings pointed out during the Training Needs Assessment. Lots of improvements were made at the processing sites. Most windows of the processing halls had been screened with mosquito nets to keep off flies and other contaminating agents such as lizards, rodents, insects and cockroaches. All the medium to large scale processors have improved on their

equipment base. In relation to the technical training, all trainees were very happy with what they learnt concerning the HQCF production, hygienic practices, specifications on HQCF production with the various standards.

## **2.6 CONCERNS OF THE MEDIUM AND LARGE SCALE PROCESSORS**

All medium to large scale processors scheduled to receive pressed cake from farmer processors complained about the poor linkages between them and the farmer processors. The intermediaries expressed fear about the farmer processors not meeting their demands of pressed cake in terms of quantity and quality. The medium and large scale processors expressed the need for additional equipment such as dryers to meet their set vision targets.

## **2.7 EVALUATION**

At the initial technical training, the trainees were generally happy about the training, and the knowledge acquired on HQCF production and related areas. They expressed the desire for more of such training and pleaded that training sessions should be more than two days. Trainees expressed appreciation on the knowledge acquired as this will help them in meeting the requirements for the production of HQCF. All the processors were happy about the strategic plans to meet set targets, they promised to work out their daily work plans to meet their set production targets. The trainees appreciated the mode of training.

## **2.8 CONCLUSIONS**

The Training Need Assessment conducted helped the CSIR-FRI to identify and effectively plan for the initial technical training of the medium and large scale processors. From the Training Needs Assessment the number of males and female employees is shown in Tables 1, 2 and 3 for the BrongAhafo, Greater Accra and Volta Regions.

**Table 1: Total number of employees of the medium and large scale processors recorded in the BrongAhafo Regions**

Medium and large scale processor	Status	No. of Women	No. of Men
Caltech Ventures	Large-scale processor	120	130
Godsway Enterprise	Medium-scale processor	35	3
Majestic Agribusiness Centre	Medium-scale processor	2	7
Marbert Limited	Medium-scale processor	6	2
Cassacoxa Limited	Medium-scale processor	6	12

Bredi Agricultural Enterprise	Medium-scale processor	4	2
1 <sup>st</sup> Door Agro-processing Enterprise	Medium-scale processor	9	6

Medium and large scale processor	Status	No. of Women	No. of Men
Amasa Agro-processing Company	Medium-scale processor	8	6
Afrimat Global Enterprise	Medium-scale processor	15	7
<b>Total no. of processors trained</b>		<b>23</b>	<b>13</b>
<b>Total no. of employees</b>		<b>182</b>	<b>162</b>

**Table 1: Total number of employees of the medium and large scale processors recorded in the Greater Accra Region**

**Table 2: Total number of medium and large scale processors trained in Ho and Hohoe Districts (Volta Region)**

Medium and large scale processor	Status	No. of Women	No. of Men
Caltech Ventures	Large-scale processor	2	8
Godsway Enterprise	Medium-scale processor	24	8
Majestic Agribusiness Centre	Medium-scale processor	2	7
<b>Total no. of processors trained</b>		<b>28</b>	<b>23</b>

## **OBJECTIVE 3: DEMONSTRATE TECHNICAL FEASIBILITY USING HQCF AS RAW MATERIAL (IN THE FOOD PROCESSING COMPANIES)**

### **3.1 INTRODUCTION**

As the first step in achieving the objective of demonstrating technical feasibility of using HQCF as raw material and possible buy-in of end users within the period under review the CSIR-FRI Team made efforts to identify potential end users of HQCF. The team visited biscuit factories in Accra and Sokode (Volta Region), Lolonyo bakery in Hohoe (Volta Region), Domestic Bursars and Matrons Association of Secondary Schools in the Volta Region and Southern Sector (Greater Accra, Volta, Eastern, Central and Western Regions), Domestic Bursars and Matrons Association of Secondary Schools at Takoradi, Western Region. The biscuit factories visited were Palays Biscuits, Britanica, Euro Foods all on the Spintex Road, Accra, Picadilly Biscuits and Fairborn, both in North Kaneshie, Accra, United Biscuits Ltd, Tema, Sokode Biscuit Factory, Sokode and Lolonyo Bakery, Hohoe, Volta Region. The visits were made between 3<sup>rd</sup> June 2009 and 22<sup>nd</sup> August 2009. The team met and had discussions with either the Managing Director/Production Manager/Quality Control Manager (or two of the above) of the biscuit factories and in the case of Lolonyo bakery, the owner of the bakery. All the companies visited welcomed the idea and agreed to work with CSIR-Food Research Institute except for one company.

### **3.2 PARTICIPATION IN END-USER ASSOCIATION MEETINGS**

The team participated in two meetings with potential end-users. The first meeting took place at Howith Domestic Bursars and Matrons Association of Secondary Schools (Volta Region group) on the 29<sup>th</sup> of June 2009. The second meeting took place on the 21<sup>st</sup> of August 2009 at Takoradi with Domestic Bursars and Matrons Association of Secondary Schools (Southern Sector group). A demonstration workshop on production of bread using HQCF and wheat flour was organised for Southern Sector Domestic Bursars and Matrons Association of Secondary Schools at Takoradi during their annual general meeting.

### **3.3 ON-SITE TRIALS**

In-factory trials are yet to be organised for the companies visited. A demonstration workshop on production of bread using HQCF and wheat flour was organised for Southern sector Domestic Bursars and Matrons Association of Secondary Schools at Takoradi during their annual general meeting on 21<sup>st</sup> of August 2009.

#### **3.3.1 GENERAL OBSERVATIONS ON TRIALS**

It was realised that companies like Palays Biscuits and Picadilly Biscuits had run some trials with HQCF in the past. They said the product that came out was promising but they raised the issue with

constancy in supply of the HQCF. Lolonyo bakery had also made some bread with HQCF in the past but this was done for a client on contract basis. The rest of the companies visited had no prior knowledge of HQCF but were very interested in running the trials. Britanica was not friendly with the team when the team visited their factory. The team was met in the reception of the company and just after the mission of the team was laid before an officer, he said "Sorry, we are not interested". The team wanted to give further explanations after this statement but the officer had made up his mind so the team had to leave.

### **3.3.2 CONCERNS OF GROUPS VISITED**

Most of the factories said they wanted to run the trials on their own with their recipes. The only input they needed from CSIR-FRI was the HQCF and the percentage levels of substitution. The Domestic Bursars and matrons association of secondary schools in Volta Region wanted their members to be trained in a group instead of dealing with individual secondary schools as proposed by the CSIR-FRI team.

### **3.4 CONCLUSION**

Eight (8) companies (seven biscuit factories and one bakery) and one (1) association of Matrons and Domestic Bursars of secondary schools (Volta Region and Southern Sector) in Ghana were visited. Eight (8) out of the Nine (9) potential industries visited were happy with the message of the team. They were happy and looking forward to collaborate with the FRI team in running the trials in-factory. Britanica biscuits however turned down the idea of substituting HQCF for wheat flour.

### **3.5 RECOMMENDATION**

It is recommended that much attention be focused on the secondary schools for the uptake of HQCF substituted bread since they consume large quantities of bread as part of their existing menu.

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