CSIR-FOOD RESEARCH INSTITUTE

CSIR-FRI/GRATITUDE

REPORT ON THE TRAINING OF YAM PROCESSORS AND MUSHROOM GROWERS

Held at

Jefkings Palace Hotel, Fafraha, Greater Accra Region on 23rd September, 2014

By

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30th September, 2014

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ACRONYMS

AR	-	Ashanti Region
BAR	-	Brong Ahafo Region
CR	-	Central Region
CSIR	-	Council for Scientific and Industrial Research
DACF	-	District Assembly Common Fund
FRI	-	Food Research Institute
GAR	-	Greater Accra Region
MUGREAG		Mushroom Growers Association of Ghana
NGO	-	Non Governmental Organization
NRI	-	Natural Research Institute
SODIA	-	Social Development and Improvement Agency
UoG	-	University of Greenwich
Volta Region	-	Volta Region

SUMMARY

The CSIR-Food Research Institute in conjunction with Social Development and Improvement Agency (SODIA) organized a training workshop for processors at Jefking Palace Hotel conference room at Fafraha in the Greater Accra Region on 23rd September, 2014. Participants were drawn from the southern part of the country. This training was part of dissemination of technologies developed under the GRATITUDE Project conducted by the CSIR-FRI. The one day training workshop was attended by 56 participants drawn from the Brong Ahafo Region. The training was to transfer three technologies developed under Work Package 2 of the GRATITUDE Project to yam farmers. These technologies were on how to effectively cure wounded yams, delay sprouting of stored yams and storage of yams in improved yam barn. They were also showed to grow mushrooms using cassava peels. The processors were grateful for the training and agreed to practice the learned technologies.

CHAPTER ONE

1.0 Introduction

The training forum was held at Jefkings Palace Hotel, Fafraha, in the Greater Accra Region of Ghana on 23rd September, 2014. The forum was organized by CSIR-FRI/GRATITUDE project under the auspices of Social Development and Improvement Agency (SODIA). The forum was organized to train yam processors and mushroom growers to effectively cure wounded yams, learn techniques involved in delaying sprouting of stored yams and further learn about the storage of yam in improved yam barn. The participants were also thought how to grow mushrooms with the waste generated from the processing of yams which has been developed under the GRATITUDE Project by the CSIR-Food Research Institute. This training workshop was a dissemination drive of technologies developed under the Gratitude project conducted by the CSIR-FRI. These four technologies were developed under the Work Package 2 of the GRATITUDE Project.

The GRATITUDE Project is a three years project which is being sponsored by the CSIR-FRI, UoG and NRI which is targeted at making Gains from the Losses of Root and Tuber crops, with emphasis on cassava and yam. It is meant to address challenges in the production, handling and processing of root and tuber crops and also find solution to the huge waste which is generated by the processing of root and tuber crops. The program is being implemented by United Kingdom, Nigeria, Ghana, Thailand and Vietnam.

1.1 Participants

Participants at the training were 56 yam processors and mushroom growers. Trainers were Dr Charles Tortoe, Mr. Solomon Dowuona and Mr. Richard Tackli from CSIR- Food Research Institute and Mr. Azizzu Issifu, representing SODIA. Participants did self-introduction before the start of the training.

1.2 Welcome Address

Mr. Azzizu Issifu, in a welcome address thanks the participants for attending the training. He told them the training will offer them the opportunity to make informed choices to enhance their business. He challenged them to take keen interest in the training. He informed them that, the focus of the training is on yams and mushroom cultivation using cassava and yam peels.

1.3 Opening Remarks

In his opening remarks Dr. Charles Tortoe of the CSIR-Food Research Institute, gave a brief introduction of the GRATITUDE Project - Gains from Losses of Root and Tuber Crops. He indicated that the project aims at reducing yam and cassava losses to enhance the role that these crops play in food and income security. Post-harvest physical losses of these crops are exceptionally high approximately 30% in cassava and 60% in yam and occur throughout the food chain. The wastes of cassava and yam come in various forms as peeling losses can be 15-20% or higher. Waste often has no economic value which can make processing a marginal business proposition. The overall objective of this project is therefore to improve the post-harvest management of cassava and yams leading to reduce physical losses, reduced economic losses through value added processing and valorization of waste products. The general objectives are in three folds to (i) Reduce physical post-harvest losses of fresh produce (focusing mainly on yams), (ii) Reduce economic losses through value added processing (focusing on both cassava and yam) and (ii) Make use of waste from the value chain (focusing mainly on cassava).

The GRATITUDE project has eight work packages. The WP1 address value chain assessment and management, WP2: Reduced post-harvest losses of fresh produce, WP3: Alternative market development to reduce post –harvest losses, WP4: Adding value to waste products, WP5: Food safety, quality and compliance: WP6: Demonstration of technologies with beneficiaries, WP7: Dissemination and support to replication, WP8: Management and monitoring and evaluation.

The yam stakeholders training is therefore part of WP2, which seeks to reduce losses in the fresh yam value chain and hence improve food security and increase incomes with a focus on small-holder farmers. Losses on-farm could be reduced by improved storage structures and post-harvest practices to reduce sprouting and improve wound-healing. This would also provide tubers of better quality to withstand damage during transport. The WP2 specific objectives are to

develop and validate strategies to improve curing of yam tubers, develop and validate strategies for yam tuber sprout control and finally identify appropriate storage structures to optimize tuber quality/storage.

CHAPTER TWO

2.0 Yam training

In a presentation by Dr. Charles Tortoe of CSIR/FRI, told the participants how important yam is to Ghanaians as a staple food, the benefits it brings to the country in the form of foreign exchange earnings. He stated that Ghana export approximately 27,000mt of yams to countries like the UK, Netherland, USA and Japan. Participants were informed that as at 2013, Ghana produces about 6.68 million metric tonnes of yam per annum. He informed them that yam production as compared to other crops comes second to cassava with 14million metric tonnes, followed by plantain, palm fruit and maize, accordingly. He told them that the production of cassava is more as compared to that of yam because yam production is very laborious and capital intensive than that of cassava. He stated that Ghana comes only second to Nigeria which produces 35million metric tonnes of yam per annum. He stated that although Nigeria produces 35million metric tonnes as compared to the 6.68 million metric tonnes produced by Ghana, Ghana exports more yams than Nigeria because majority of the yams produced by Nigeria is consumed in the country.

The participants were taken through safe handling of yams from production, harvesting, sorting, packing and transportation to the market or the yam barn for storage. He also showed the participants the enormous benefits that come with using the improved yam barn to that of the traditional barn, which allow the stored tubers to be attacked by rodents and other animals that stray into it, and the fact that tubers kept in the improved yam barn keeps longer on the shelves than that of the traditional storage barn. They were also taken through food safety concerns as processors. Participants were taught techniques on how to delay sprouting in yam tubers with the use of 600ppm potah solution. Participants were also taught how to cure wounded yam to avoid infection through the wounded site by yam wound pathogens. Figure 1 and 2 shows a cross section of participants and the presentation by Dr. Tortoe.

Figure 1: Cross section of participants at the forum

Figure 2: Dr. Tortoe making a presentation during the training

2.1 Demonstration of Curing and Sprout Control Techniques

Mr. Solomon Dowuona, a technologist at the CSIR- Food Research Institute, demonstrated the curing and sprouts control strategies to the participants. He artificially created wounds on a wholesome tuber and showed the participants how to cure the wounds using jute sack. With a 600ppm potash (burnt cocoa pod) solution he taught the participants the techniques involved in sprout control. He immersed the apical portion of the yam tuber into the 600ppm potash solution and kept it in for 120 seconds, after which he removed it from the plant extract solution. The tuber was then dried and ready to be stored in an improved yam storage barn.

2.2 Mushroom training

Mr. Richard Takli of CSIR/FRI, in a presentation told the participants that mushroom is a macro fungi that grows on decaying organic matter. He took participants through the stages of mushroom production which includes fermenting the substrate, filling into heat resistant polyethane bags, compressing the bags, sterilization of the bags, inoculating and cropping. He informed the processors that they can make a lot of money out of the huge waste generated as they process cassava and yam. He told them that the yam and cassava peels can be added to sawdust in a suitable proportion to grow a very high quality and nutritious mushrooms. He informed participants that mushrooms when cultivated on a large scale and in appropriate manner can bring in about 65% returns. He told them that the GRATITUDE Project focuses on the use of cassava and yam peels to grow mushrooms. The research finding shows that a substrate mixture of 50% cassava peels and 50% sawdust gives the best yield in terms of nutritional content when the fruit bodies were examined and compared with that of the 100% sawdust. Yam peels also performs creditability during the trial but not to the extent of cassava peels. A challenge with yam peels is that it is not readily available like that of cassava peels.

A representative of the organizers of the forum, Mr. Azzizu Issifu, told participants to form association and cooperate with each other. He made them aware that with the associations they stand a better chance of accessing funds and trainings from a number of NGOs, World Bank and the DACF. The associations can also assist in exporting. Participants were made aware that they are business men and women and that they have to be bold and take risks. They were told not to always rely on government to run their business.

After the presentation by Mr. Richard Tackli, the participants were divided into two groups made of yam processors and mushroom growers to deliberate on the things leant and to elect five people each to serve as group leaders as shown in figure 3 and 4.

Figure 3: Mushroom Growers Group

Figure 4: Yam Processors Group

CHAPTER THREE

3.0 Contributions, Questions and Answers of yam processors

1. Is there a training manual for the technologies that has been developed?

All the technologies that we have developed are available in simple brochures and manuals that can be access for free at the reception of CSIR/FRI.

2. What is the HQCF meant for?

It can be used to produce pastries and confectionaries, glucose syrup and ethanol, food products such as banku mix, tuo zaafi

3. What is the effect of the use of cocoa potash on the consumer?

It has no adverse effect on the consumer

4. Are cocoa farmers being train on how to produce the potash?

Yes, at some areas where cocoa is cultivated the farmers are being train on how to produce potash from burnt cocoa pods.

5. Can the yam be transported in jute sacks?

No, the jute sack is for curing superficial wounds that occur during harvesting.

6. Taking into accounts problems that we encountered with RTIMP, when we went into large scale cassava production. What are you doing this time around to avoid such challenges?

This project is to reduce waste in root and tuber crops. It is a value addition to these crops for farmers as they go into large scale yam production like what RTIMP did.

7. Is the project going to provide processing equipment to processors?

No, the project is not providing equipment for processors.

8. I am a yam farmer and processor from the Volta region. This is the first time I'm hearing that yams can be cured of superficial wounds. Are you going to train yam farmers all over the country on these newly developed technologies?

The training has stated. We have already been to some yam growing areas like Atebubu-Amantin Districts and Techiman districts to train yam farmers and AEAs. When the project supports us, we will train in all the yam growing areas in the country.

9. How can a group or SME access these technologies that you have developed and at what cost?

The technologies can be access for free at CSIR/FRI.

10. Is yam fufu flour different from that of the yam flour?

The yam *fufu* flour is for making instant *fufu* but the yam flour is for making composite products like bread, cakes and chips with different flour percentages. They are not the same.

3.1 Contributions, Questions and Answers of mushroom growers

1. How long does it take to harvest after seeding?

After you inoculate, it takes 4 to 6 weeks to be ready, after which the compost bags can be taken to a cropping house for 3 to 5 days to start harvesting mushrooms

2. How much does it cost to be trained on mushroom production at CSIR/FRI?

Currently it cost GHC 400 to be fully trained in mushroom production.

3. Why is the contamination rate high for cassava peels?

All the substrates that are used in mushroom production come with their own microorganisms. Since cassava is uprooted from the ground, the microbe content tends to be high and causes the contamination rate to be high. This can be solved when the sterilization time is increase from 3 hours to 4 hours.

4. Can oil palm fibre be used to cultivate mushroom?

Yes, oil palm fibre can be used but it falls outside the scope of the project.

5. Why is it that there are no standards for freshly produce mushrooms?

There are standards for processed products but not for fresh unprocessed mushrooms.

6. Is there a cold room for the growers to store mushrooms?

Yes, the mushroom growers association has produce marketing company with a cold room for the members and the public.

7. A participant expressed concern about the unavailability of cassava and yam peels in GAR and noted that it is due to competition they having with those raising goats and sheep.

Figure 5: Participants asking questions during the training

CHAPTER FOUR

4.0 Remarks by participants

Rev. Theophilus K. Quartey, president of the Mushroom Growers Association of Ghana on behalf of the participants, thank the organizers of the training forum and expressed their will to go and put the knowledge that has been acquired through the training to good use.

4.1 Wrap up and Closing remarks

In wrapping up, Mr, Azzizu Issifu, a representative from SODIA thank participants for attending the training and appealed to them to put whatever they have learn during the training into practice.

Appendix 1: Attendance list

S/N	NAME	LOCATION	MOBILE NUMBER	E-Mail ADDRESS
1	Atsu Christian	G.F.W.A/ VR	0248130804	
2	Salome Addo	G.F.W.A/ GAR	0243380596	
3	Iris A. Tamaklo	Iris Kitchen/GAR	0244645688	
4	Francis Lavoe	Iris Kitchen/GAR		
5	Kwabene Darko	MUGREAG/ BAR	0204161900	
6	Richard Adu Assan	MUGREAG/ BAR	0203575898	
7	Vista Ahinakwa	MUGREAG/ BAR	0208961272	
8	George Mantey	Adenta Healthy Food/GAR	0266167495	
9	William Ayettey	Adenta Healthy Food/GAR	0204094848	
10	Alexander Kweku Odoom	Global Farming/CR	0542333001	
11	Patrick Amoako Ankrah	MUGREAG/ BAR	0262070393	
12	Rev. B. J. Aikins	Global Farming/CR	0202660018	
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17	Isaac kyeremeh	MUGREAG/ BAR	0200403043	
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19	Emmanuel Adjei	G.F.W.A/ AR	0243236963	
20	Frank Tetteh	G.F.W.A	0546764820	
21	Joseph K. Biney	Peace & Love Asso. Kwanyako	0249298762	
22	Akua Atta	Kwanyako/ CR	0542237871	
23	Samuel M. Mensah	Kwanyako/ CR	0240696940	
24	Samuel Egyiri	Kwanyako/ CR	0240696940	
25	Ps. Amoako Edward	MUGREAG/ BAR	0249892385	
26	Elsie Augustt klinogo	G.F.W.A /GAR		
27	Isaac Kwaku Ghartey	G.F.W.A /CR	0207463853	
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38	Nancy A. Darko	Ashiyie, Accra		

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54	Daniel Gyebi	Kumasi/AR	0244936157	
55	Otivia Coleman	Thesis Kitchen		
56	Abena Aboagyewaa	Mushroom farmer		