

'SUSTAINABLE INDUSTRIAL MARKETS FOR CASSAVA' PROJECT

**TRAINING WORKSHOP ON UTILIZATION OF CASSAVA FLOUR AS
PLYWOOD EXTENDER**

BY

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A REPORT ON THE TRAINING WORKSHOP ON UTILIZATION OF CASSAVA FLOUR AS PLYWOOD GLUE EXTENDER

INTRODUCTION

The process of plywood production involves gluing together thin sheets of veneer. Resin glues are expensive and cereal flour are normally mixed as extenders to reduce cost. The extender of choice is wheat flour which is imported and therefore costly.

Opportunities exist for using cheap cassava flour to replace wheat flour as plywood glue extender. However, some problems associated with the use of cassava flour extender make it unattractive for plywood mills. Out of ignorance and / or lack of knowledge to buy high quality cassava flour, the few plywood mills using cassava flour were buying from unreliable sources and this could contribute to the problems encountered.

From the in-factory participatory trials at various plywood mills, it is necessary to gather the glue formulation staff and sensitize and equip them with technical expertise in using cassava flour as extender.

PARTICIPATION

Participants were drawn from selected plywood mills in the Ashanti and Western Regions of Ghana. Two senior members in managerial positions including the production manager came from each plywood mill.

OBJECTIVE

The objective of the training was to equip staff of plywood mills with adequate insights and technical expertise in the use of cassava flour (to replace wheat flour) as glue extender, share experiences and assess the adequacy of their own institutional environment and propose scenarios for change so as to create new market outlets for cassava.

WORKSHOP OUTLINE AND TRAINING METHODS

The training was based on experience-sharing and task-oriented learning for and by the participants and resource persons.

The workshop was divided into morning and afternoon sessions. The morning session extensively covered laboratory activities:

Formulation Laboratory

At the formulation laboratory, participants and resource person developed together cassava flour extended glue. Critical, creative and constructive questions were explored as various substitution levels of cassava flour were made. Participants were also taken through the determination of moisture content of cassava flour as a factor in glue formulation.



Resource person formulating plywood adhesive with cassava flour as extender.

Laboratory Press

At the laboratory press, 3-ply plywood were made using veneer and the prepared glue. The need to adhere to conditions for pre-pressing and pressing was brought to the fore as deviations (intentional) from the conditions resulted in poor bonds.

Bond Strength Testing Laboratory

Participants were taken through the operations of the Instron machine which measures the shear strength of the glue bonds. This, they were enthusiastic about and saw it as a more rigorous test than the knife test commonly used in the mills.



Resource person demonstrating the use of the INSTRON machine to determine the bonding strength of the plywood glue.

The afternoon session combined theory with practical experience sharing:

**MINUTES OF TRAINING WORKSHOP ON UTILIZATION OF CASSAVA
FLOUR AS PLYWOOD GLUE EXTENDER HELD ON WEDNESDAY 25TH
FEBRUARY 2004 IN KUMASI**

VENUE: FORIG's Conference Room

OPENING

The meeting started at 2.00 p.m. with a welcome address by the Project Coordinator, Dr. Daniel Sekyere.



The Director of FORIG delivering the Welcome Address

The meeting was chaired by Dr. J.R. Cobbinah, the Director of FORIG. In his introductory remarks he welcomed members and apologized for the late start of the programme due to power failure. He reiterated that the objective of the workshop was to update knowledge and experiences in the utilization of cassava flour as plywood glue extender.

He further stated that the project was on going one and like all other projects, there was the need to pause periodically and reassess in accordance with the work plan of the project. He expressed the hope that the discussions and deliberation will be fruitful and beneficial to all partners.

PROGRAMME STRUCTURE

The workshop was divided into two sessions – morning and afternoon’s sessions. The morning which was devoted to laboratories lasted for four (4) hours. The afternoon session was a technical one devoted to project presentations.

Dr. N.A. Darkwa one of the Project Team Leaders gave an overview of the project. In his presentation he indicated that:-

- Funding Agency is DFID
- The project is in three phases
- There are five (5) technical partners to the project namely:
 - FRI – responsible for processing of cassava flour and sugar syrup
 - University of Ghana, Legon – responsible for converting sugar to alcohol
 - FORIG – responsible for processing of cassava flour as adhesive and extender
 - MOFA – Responsible for the cultivation and propagation of cassava
 - NBSSI – responsible for the promotion and adaptation of the technology to the industry.



Former project team leader giving an overview of the Cassava Project.

He indicated that under the 2nd phase of the project (the industrial use of cassava).

FORIG is mandated to:-

- Determine the physiological properties of the cassava as a raw material substitute for wheat.
- Identify the industries and their needs
- Use cassava as extender and substitute for wheat
- Improve the water capacity of urea formalin for adhesive features

He reiterated that final phase of the project will involve the interplay of all partners including entrepreneurs who would be the suppliers of the cassava flour to the various industries, whilst FORIG provides the needed technical support.

In his concluding remarks he said extenders produced by FORIG has been tested on trial basis at five (5) mills. And as a follow-up a forum would be organized in Accra to update information on the project.

Second Presentation

The second presentation on: “The role of extenders (with special reference to cassava flour) in plywood adhesive mix” was given by Mr. S.A. Derkyi, in a power point presentation. He threw more light on the following:-

- Project background
- Developmental and specific objectives
- Definition of extenders
- Importance of extenders
- Factors determining the best type of extender
- Determination of dry matter
- Determination of WBC
- Comparison between cassava flour and wheat flour
- Problems with the use of cassava flour as extender



Resource person delivering his talk on ‘The role of extenders (with particular reference to cassava flour) in plywood adhesive mix’.

In his concluding remarks Mr. Derkyi emphasized on the preference for the use of cassava flour as extender to wheat flour due to the following advantages:-

- Reduction in glue line cost
- Reduction in environmental pollution
- Increasing pot life of adhesive
- Ensuring good spread

Third Presentation

Mr. J. deGraft-Yartey presented the third paper on “The effect of extenders (with special reference to cassava flour) in plywood production”.

His presentation touched on the following background information on:

- Extenders and fillers
- Determination of adhesive properties of extender and fillers and their compositions
- Glue application
- Determination of water content of the various raw materials used as extenders/fillers
- Standards of extenders use in Ghana

- Observations at the various visited mills

Some of the issues raised by Mr. J. deGraft-Yartey included:-

- Lack of control at the mills in terms of appropriate viscosity determination
- Co-pressing the possibility of reducing raisin content using cassava flour.
- Five hundred (500) boards have been produced on trial basis using the new breed of cassava flour as extender, and so far no case of decay has been reported
- Improper functioning of machines e.g. spreading machines throwing away glue during processing



Resource person delivering his talk on 'The effect of extenders (with particular reference to cassava flour) in plywood production

In an answer to a question about the type of variety of cassava used, it was noted that the variety being used is called 'Abasafitaa'.

In his concluding remarks he urged the participants to use the new breed of cassava which is in abundance for best results. He again stressed the need for the Project Team to inform policy makers of the production of cassava flour and its uses as extenders by the CSIR.

He gave assurance that FRI is working to get a uniform and consistent particle size to ensure effective and stronger bonding. He then assured the industrialist of their continuous support.

DISCUSSION

A member wanted to find out the right formulation of the various extenders so as to obtain maximum results. In an answer, the Project Leaders indicated that the ratio could either be 100% cassava flour substitution, 80/20, 90/10, 60/40 depending on the choice of the individual firm. However most of the firms present preferred the 100% ratio.

In a related issue a member pointed out that he had problems with the bonding when he used cassava flour as extender. In reaction, the Project Leaders attributed occasional problem to poor mixing and defective machines used to process the cassava flour, citing Omega Company Limited in Kumasi.

However they indicated that the mixing of cassava flour at Primewood Company at Takoradi was more efficient.

In a related issue the Project Leaders admitted that improper weighing of the cassava flour as well as the source of veneer could also pose some problems.

EXPERIENCE FROM SOME PLYWOOD MILLS

The representative of Bondplex Company Limited, Kumasi in sharing his experience with the house indicated the following:-

- That the cassava flour has been used by a company in the Phillipines that he worked for the past 25 years and the results have been good.
- The use of the cassava flour as extender has proven to be cheaper
- Banana flour is also used sometimes as extenders
- Sawdust and rice husk and coconut husk can also be used as fillers

He gave a number of underlying factors which when ensured give best results for the use of cassava flour as extender. These include:-

- Proportion of the extender
- Composition of the mix
- The viscosity standard requirements
- Knowing the standard glue spread
- Proper weighing of the various composites
- Availability of skilled and reliable labour
- The correct temperature and pressure requirements
- The volume of plywood needed



Experience sharing: Contribution from a participant.



Question from a participant

EXPERIENCE FROM WVLC

The representative of WVLC also said cassava flour as extender has been used by his company for the past ten years and problem that has been encountered so far is with the texture of the flour due to the use of unsuitable mesh size. He however confirmed that when the company adapted the use of the new breed of cassava, the results had been good.

In a contribution, a member advised the researchers to research into a variety of cassava with high viscosity. In reaction, the Project Leader indicated that a new variety with high viscosity has been identified. However it is necessary to dry it to the barest minimum in order to get best results. The Chairman at this point stressed the need for researchers to develop guidelines for quality control of the variety of cassava, composites and mixing compositions.

The Project Leaders accepted the challenge of developing guidelines and gave the assurance that two (2) to three (3) new trials would be conducted and a manual published in due course.

In view of high volume requirement of cassava flour in industries, a member asked about its availability and sustainability. In an answer the Chairman stressed the need for the Project Leaders to harmonize their activities with the President's Special Initiative on Cassava so that the 'Abasafitaa' could be cultivated on a very large scale. In a contribution it was noted that 2 members of the Project Team are also members of the PSI group.

The Project Leaders also pleaded with the millers to give them the maximum support and cooperation whenever they visit their mills so as to have a very good and reliable research results.

In a comment the Chairman observed that the Industry-Research Linkage leaves much to be desired because of suspicion. He therefore called for strategic partnership between research and industry.

CLOSING REMARKS

In his closing remarks, the Project Coordinator, Dr. Daniel Sekyere emphasized the reasons why the project must be embraced by all. The reasons he gave were as follows:-

- Favourable Political Environment
- Conducive Economic Environment

- In terms of price, cassava flour has comparative advantage over wheat flour
- Ability to negotiate price with suppliers of cassava flour
- Ability to store the cassava flour at normal room temperature without any effect on its viscosity
- Increasing volume of cassava on the market due to the PSI on cassava
- Its ability to be used both as fillers and adhesives.

He finally expressed the Project Team's appreciation to the sponsors DFID for supporting a worthy course.

The Chairman rounded off the workshop by expressing special thanks to all participants especially the Project Team and all other stakeholders for their support and cooperation and wished them success in their future endeavours.



Project team leader delivering the closing remarks

CLOSING

The workshop ended successfully at 4.50 p.m.

REACTIONS FROM PARTICIPANTS

‘This training workshop and your in-factory-participatory trials have definitely changed my views and perceptions about cassava flour as extender for the better. I know my Company is going to increase its profit margin’.

‘The workshop has given me confidence in the use of cassava flour as extender in plywood glue mix. We were using the cassava flour, but initial problems made us stop using it. With the problems solved, we are hopeful to go all out with the cheap cassava flour so as to make some savings to the Company’.

‘The training workshop was of great learning experience to me. The best part being the opportunity to share experiences with participants from other Companies. I have now gained insight into the problems and solutions as far as cassava flour extender is concerned. The workshop has helped me as a person to open up to challenges and this will help me both at work and personally’.



Group Picture of participants

PRESENT

Dr. J.R. Cobbinah	-	FORIG	-	Chairman
Dr. D. Sekyere	-	“	-	Member
Dr. N.A. Darkwa	-	“	-	“
Mr. deGraft-Yartey	-	“	-	“
Mr. S. A. Derkyi	-	“	-	“
Mr. Francis Wilson Owusu	-	“	-	“
Mr. Ernesto Durano	-	Bondplex Co. Ltd.	-	“
Mr. James Nuako	-	Log & Lumber Ltd.	-	“
Mr. Francis Mozu	-	Western Veneer & Lumber Co. Ltd.	-	“
Mr. J.W.K. Crentsil	-	“ “ “	-	“
Mr. Bismark Dampte	-		-	“
Mr. Bart Addison Henry	-	Omega Wood Processing Ltd.	-	“
Ms. Mercy Owusu Sekyere	-	KNUST	-	“
Mr. Kofi Sarpong	-	FORIG	-	“
Ms. Bridgette Brentuo	-	“	-	“
Mr. K. Prempeh Bandoh	-	“	-	“
Ms. Patience Nimoh	-	“	-	“
Mr. Bukari Darimani	-	“	-	“
Mr. John K. Yalley	-	Ghana Primewood Ltd.	-	“
Mr. Frank Konadu	-	“ “ “	-	“
Mr. Daniel Agyemang	-	Omega Wood Processing Ltd.	-	“
Mr. Anthony Kwakye	-	Logs & Lumber Ltd.	-	“
Mr. Samuel Adu-Poku	-	FORIG	-	“
Mr. Maxwell Osae Bekoe	-	“	-	“

RAPPORTEURS

Mr. F.O. Amofah	-	FORIG
Ms. Comfort D. Konto	-	“