Use of high quality cassava flour by bakery industries in Malawi

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Abstract

Cassava (*Manihot esculenta* Crantz) is an important root crop in Malawi and in sub-Saharan Africa. In Malawi, cassava has been produced mainly for household consumption as staple diet in most parts of the northern and southern regions, and as a snack and substitute to bread amongst most households including those in the high-income category. Efforts in the past to commercialize cassava flour have not been very successful due to shortage of supply on one side and lack of market information on the other side. Other reasons are the low value crop status given to cassava as a poor man's crop, limited cassava product development that could be suitable for both low and high-income people.

Potential for use of cassava flour by bakery industries has not been fully exploited in Malawi and in the region because of lack of innovation on processing technologies. Lack of high quality cassava flour conforming to the grades and standards has been a major set back for local industries consumption.

To promote cassava flour in the bakeries IITA/SARRNET has embarked on creation of awareness and demonstration on the potential of substituting partly wheat flour in bread making. The purpose of this paper is to highlight the experiences that have been made and strategies to be followed in commercializing high quality unfermented cassava flour for use by bakeries in Malawi. The paper also highlights strategies to be followed in sustaining the market demands by the bakeries and the challenges that are likely to be faced in penetrating the market.

Tests already carried out indicated that inclusion of cassava flour from 10% up to 33% produces good bread with all the desired qualities. Hence there is need to sensitize bakery industries to start using cassava flour and embark on sensitizing farmers and processors for processing high quality unfermented cassava flour that can meet the bakery standards and link them to markets

Résumé : Utilisation de la farine de haute qualité de manioc par les boulangeries au Malawi

Le manioc (*Manihot esculenta* Crantz) est une plante à racine importante au Malawi et en Afrique sub-saharienne. Au Malawi, le manioc a été souvent produit comme aliment de base pour la plupart des ménages des régions du Nord et du Sud. Il est aussi utilisé comme casse-croûte ou produit de remplacement du pain dans la plupart des ménages jusqu'à la catégorie des ménages à revenu élevé. Les efforts antérieurs pour la commercialisation de la farine de manioc n'ont pas beaucoup réussi à cause du manque de l'offre régulier d'une part et du manque de l'information sur les marches d'autre part. Le statut inférieur donné au manioc comme culture des pauvres, le développement limité des produits convenables à base de manioc aux gens à faible et à haut revenu sont des facteurs supplémentaires qui entravent la promotion de la culture du manioc.

Le potentiel de l'utilisation de la farine de manioc par les boulangeries au Malawi et dans la région n'a pas été exploré complètement à cause du manque d'innovation des technologies de transformation. Le manque de farine de manioc de haute qualité en conformité aux normes requises a été un grand handicap pour la consommation par les industries locales.

Dans ses efforts de promouvoir la farine du manioc dans la fabrication des pains par les boulangeries, IITA/SARRNET s'est embarqué dans une campagne de sensibilisation et de démonstration sur les potentialités de substitution partielle de la farine de blé dans la fabrication des pains. Cet article donne les points saillants sur les expérimentations faites et les stratégies à utiliser pour la commercialisation de la farine de manioc de haute qualité et non-fermentée pour son utilisation dans la panification au Malawi. Cet article montre également les stratégies à adopter pour maintenir la demande par les boulangers et les défis probables pour pénétrer ce marché.

Les tests menés indiquent que la farine de manioc mélangée de 10 à 33 % avec la farine de blé donne des pains de qualité bien acceptée par les consommateurs. Par conséquent, il est nécessaire de sensibiliser les boulangers pour commencer à incorporer la farine de manioc et aussi sensibiliser les

paysans et transformateurs pour produire de la farine de manioc de haute qualité et non fermentée aux normes des boulangeries. Les paysans/transformateurs pourraient ainsi être branchés aux marchés offerts par les industries.

Background

There is evidence that cassava flour can partly substitute up to 33% of wheat flour in baked products. Many studies conducted and books published indicate that cassava flour can partly substitute up to 20% wheat flour to make bread without significantly affecting the quality of bread. Bakery industries and other manufacturing industries in Malawi are facing serious problems in importing raw materials from other countries and prices for these materials are very high, reducing the profit margin of the industries. For bakeries, the high import prices for wheat have pushed the price for bread and other products to increase, thus making them not affordable by average Malawian.

Cassava is a multipurpose crop and offers a considerable potential role in food, confectionery, feed and industrial sectors through product diversification. Cassava may also be used in bread making. This is an alternative solution which can help to alleviate some of the problems that bakery industries in Malawi face.

Cassava flour can be used to bake bread, yellow bans, white bans, milk scones, biscuits, cakes, flitters, dough nuts and other products made from wheat.

Bakery industries in Malawi are facing serious problems of trying to reduce the costs of production for all their products due to high landing cost of raw materials. The increase in price of wheat has raised the price of baked products. The factors that have led to high prices are increase in imported inputs, reduced foreign exchange earnings, limited use of appropriate technologies from applied research into alternative substitutes for raw materials. Inadequate linkages in the supply chain among researchers, bakery industries, processors, transporters and farmers among others, affect the scaling up of cassava flour in bakeries.

This paper therefore reports on the potential levels of cassava flour at which it can be partly substituted to wheat flour in bread making. It also highlights the strategies and sustainable mechanism that IITA/SARRNET has taken to promote cassava flour utilization by industries in Malawi.

Cassava flour in Malawi for Bakery Industry

Previous work on cassava flour research by bakery industries began in early 1990's with some testing to mix wheat with cassava flour for bread. The major player on the forefront of this research was the Blue Ribbon, which by then was the major bread baking company in Malawi. The results after testing were very positive and Blue Ribbon was ready to adopt the technology. The major constraints by then were on the supply of already processed cassava flour and its sustainability. Thus the bakery industry did not pursue this approach.

Recently, IITA/SARRNET has taken up the issue by analyzing the previous challenges that made cassava flour not penetrate the industries, and came up with intervention to improve the supply chain. If adopted this technology will help the bakeries reduce cost of production thereby making more profits and cassava farmers finding market for high quality cassava flour. In addition the reduced price of bread and other baked products will become affordable to most Malawians. Malawi will also increase foreign exchange earnings by reducing the importation of wheat flour from other countries.

Approach used to promote high quality cassava flour into bakeries

Wheat cultivation in Malawi is very little with an annual production of 1,668 metric tons per year (FEWS NET 2004), but cassava, which can play similar roles by partly substituting wheat

Table 1

Year	Hacterage (ha)	Yield (Metric tons)
1989/90	61,506	344,280
1990/91	71,619	503,454
1991/92	63,965	386,481
1992/93	75,050	648,015
1993/94	72,149	750,198
1994/95	94,651	958,572
1995/96	116,523	1,603,647
1996/97	125,813	2,118,144
1997/98	151,941	2,414,781
1998/99	166,125	2,686,260
1999/2000	166,251	2,509,799
2000/01	97,254	1,656,572
2001/02	102,879	1,540,183
2002/03	112,071	1,735,065
2003/04	156,645	2,559,319

Table 2

Year	Quantity in metric tons tons	Total Costs in US Dollars	Quantity of cassava flour at 20% metric tons	Landing Cost per metric ton	Foreign Exchange saved in United States Dollars
2000	28,511	4,455,298	5,702	156.3	891,222
2001	577,798	5,337,129	115,559	9.2	1,063,143
2002	44,129	9,302,121	8,825	210.8	1,860,310
2003	33,524	9,971,830	6,705	297.5	1,994,738

four in bakery industries, is extensively grown throughout the country and its production has increased from 344,280 metric tons in 1989/1990 to 2.6 million metric ton fresh weight in 2003/2004 (Table 1). The increase is attributed to the recurrent droughts, which have necessitated farmers to diversify food crop and adopt drought tolerant crops such as cassava and sweet potato. The growing importance of these crops for cash, has also contributed to their expansion. Efforts taken by the Government in collaboration with its partner including IITA/SARRNET to promote these crops have also played a significant role.

Current production of cassava is estimated at 2,559,319 metric tons of fresh weight, (see Table 1). This means if bakeries are to be satisfied based on the partial substitution of imported wheat flour with cassava flour, there is need to increase the production.

IITA/SARRNET is now looking at the whole commodity chain to make the use of cassava in the bakery industry sustainable by addressing issues related to all the segments of the chain from pre-production to consumption.

Production and consumption level in Malawi

In Malawi all the wheat flour is imported. The quantities of wheat flour imported for industrial use from the year 2000 up to 2003 is shown in the Table 2. The quantities of imported wheat flour are going down as the landing cost increases every year. In 2003 the landing cost of wheat flour was US$297.5 compared to US$156.3 in 2000. This has resulted in decrease in utilization of wheat flour for industrial use because the price has gone up due to high landing cost of wheat flour.

If Malawi adopts cassava flour into the bakery industry at 20% substitution, the amount of foreign exchange that could be saved for instance in 2003 was supposed to be US$1,994,738. (See Table 2)

Bakery testing conducted

A number of demonstrations/training were conducted in all the three regions of Malawi and positive results were obtained for bakeries after composite bread were evaluated by their customers

The demonstration also capitalized on how to make good quality bread from cassava flour and wheat flour.

Successes to promotion of cassava flour in bakery industries

A. **Proper recipe and levels of ingredients-** There is need to formulate right levels of ingredients for making different baked products. Since cassava flour has no glutenin, mixing wrong levels of ingredients could affect the baked products.

From the results of the analysis, profit increases by adding more cassava flour up to 33%. Beyond 30% the bread quality may be affected. It should be observed that in Malawi, bans make more money and are fast selling. Based on a 50 Kg mixture the 100% bread and bans brings a profit margin of US$5.65 and bans US$6.6 respectively. While composite and bans a made from cassava flour (20%) and wheat flour (80%) bring profit of US$8.7 and US$9.4 respectively (see figure 2).

Between 10 to 20% mixture the quality of products is very good. This agrees with Malawi Bureau of Standards findings on cassava bread assessment conducted in 2001.

B. High quality and standards of cassava flour-IITA/SARRNET is approaching the whole commodity chain to have high quality cassava flour be supplied to bakery industries. Farmers at production levels are being supplied with improved cassava varieties that are at the same time high yielding and disease free, through NGO's or faith based groups. Farmers have been organized into groups/associations to do processing for initial value additions by grating (bitter varieties) or chipping (sweet varieties) cassava roots. Within the three regions of Malawi farmers' groups have been linked to one processor who will be buying dried chips or grates from farmers for milling into flour and supplying to industries the packed cassava flour. The link person has been already assisted by IITA/SARRNET on the packaging materials and farmers groups and association to supply cassava flour have been mobilized.

C. Timing of the mixture from the steamer to the oven-this has serious problem if correct time that the dough takes in the steamer and oven is not controlled. When the dough expands more in the steamer, and is removed from the steamer it should go straight into the oven with extra care because it becomes very soft and can collapse reducing the quality of bread. For good quality, the bread or scones should be well timed in the steamer and before it fully expands, and taken into the oven. In the oven the dough expands further before being baked.

D. Sustained supply of cassava flour- all commodity chain of cassava from production, processing, and marketing are now being addressed to avoid breaking down the chain. Farmers have been empowered with the necessary skills at all levels for collective action to the identified markets. Currently IITA/SARRNET is working on external factors that could affect the utilization of cassava flour by bakery industries. One such external factor is the advocacy on policy change for baked products. Contacts are in progress with the government.

E. Quality of wheat flour-there is need to promote and recommend cassava flour, which blend and produce composite bread of high quality. Some of the wheat flour do not produce high quality bread when mixed with cassava flour.

The way forward for cassava flour into bakery industries

In trying to have cassava flour penetrate the market a number of issues need to be addressed and these are

High quality cassava flour for bakery industries

- Bakeries expressed interest to be supplied with already premixed cassava-wheat flour. The formulated ingredients should be for 50 Kilogram dough mixtures.
- Farmers, processors and bakery association need to come up with competitive price structures for equity and profitability to all.
- More awareness campaigns are needed to promote the products including the social marketing to correct the unfair "cassava stigma".

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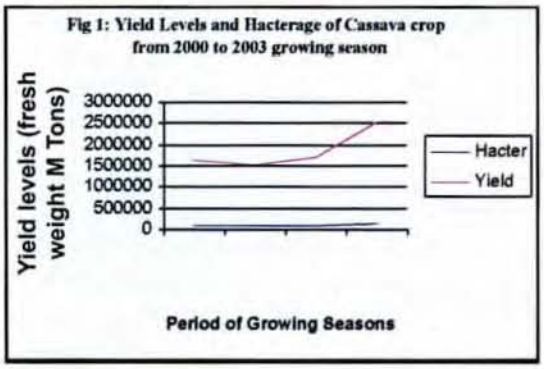

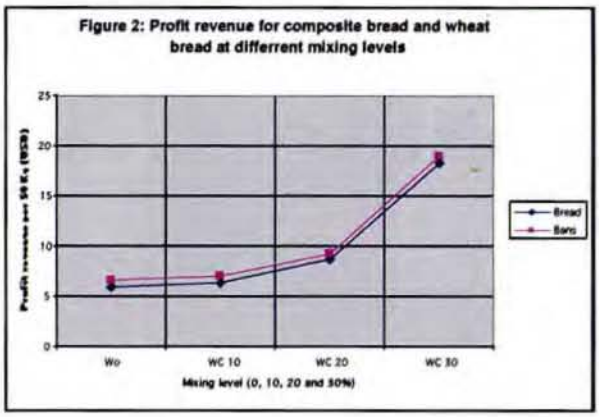

CASSAVA COMMERCIALISATION EXPERIENCES AND IDEAA MIS ROLE IN PROMOTING AGRICULTURE TRADE.

By
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Introduction

Initiative for Development and Equity in African Agriculture (IDEAA) with funding from the Rockefeller Foundation has since 2002 been working on commercialization of cassava to develop a stable cassava market, which would contribute to increased income, and food security of the participating farmers.

The project had three interventions areas and these evolved around production, processing and market access. Its strategy was to work with selected 210 magnet farmers scattered across the country in collaboration with various development partners. The magnet farmers had a duty to attract other farmers into cassava farming and mobilize them into associations or groups at various levels. This article highlights IDEAA experiences across the whole cassava commodity chain from production to marketing.

Production Experiences

Through seed multiplication program, over 500 mt of cassava seed was distributed to 5,000 cassava farmers in groups or as individuals for establishing communal nurseries with an aim of sharing the seed in the next growing season or sell the materials as a business.

One major problem that some cassava farmers faced was the attack of cassava mosaic disease. Farmers were advised to uproot diseased cassava plants but as usual were very reluctant to do so. Like those in Nkhotakota Linga EPA they used the seed to establish a farmer field school. The farmers refused to uproot diseased plants because they said it was part of the study topic to see if the crop would still produce roots. Good campaign awareness is needed as this can mislead farmers as some of the infected plants, when uprooted had good roots.

Processing Experiences: the case of Mbwandimbwandi Garderns

Cassava crop because of its unique properties is able to be used in a variety of ways which makes it to have none of its parts thrown away; starting from the leaves which are used as animal feed and human relish, stem used as firewood and seed, and lastly root used as a fresh snack and processed into flour. The flour from cassava can be made into the traditionally normal food nsima (thick porridge), and also various confectionery products.

Most remarkable processing experiences take place at Mbwandimbwandi Garderns of Mr. Augustine Phiri. Mr. Phiri is the national Chairman of cassava growers and marketing association. Mr. Phiri is an innovative farmer who puts into practice what he learns. The following section describes the Phiri Family experiences with Cassava Commercialization.

i. Confectionery products

chirichiri

cakes

biscuits

The above products are made of 100% cassava flour.