FOOD RESEARCH INSTITUTE

(Council for Scientific and Industrial Research)

COWPEA FLOUR PROJECT: EXPERIENCES
IN TRIAL MARKETING TOWARDS COMMERCIALIZATION

PRESENTED BY:

BEN AWOTWI

SEPTEMBER 1989

REPORT NO.

FOOD RESEARCH INSTITUTE (CSIR)
P.O. BOX M. 20,
ACCRA - GHANA

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A C K N O W L E D G E M E N T

I am indebted to the Trustees of the Valco Fund, (Ghana) for supporting this important and necessary part of the Cowpea Project.

I gratefully acknowledge the keen interest and co-operation of Mr. K,K. Eyeson, Director of the Food Research Institute and all the Officers and technical staff of the Food Economics and Utilization Division that took part in the project. Special mention is made of Mrs. Florence Dake and Mrs. Iris Tamakloe for demonstrating the uses of the cowpea flour and assisting in the test marketing; Mr. Liquenda Allotey for assisting in theproduction of the cowpea flour and our devoted driver, Mr. I.A. Abbey.

Once again, thanks to the I.D.R.C. for funding the basic research towards the development of the standard cowpea flour.

Finally, my sincere thanks go to Dr. (Mrs. Florence Efua Dovlo, Head of the Division for cordinating the project and for her valuable assistance in writing this report.

BEN AWOTWI

F O R E W O R D

The cowpea project was one of the first projects directed to solving problems associated with food utilization.

At the instance of the International Development Research Centre (I D R C) of Canada, that provided funding and equipment, the project started in 1977 with studies on cowpea production and marketing in Ghana, consumer preferences for the many cowpea varieties available and the uses for which each type is suitable. The physical, chemical and cooking properties of the different cowpea grains were studied as well as their processing methods and dietary utilization.

In the course of the studies, problems or constraints related to the processing and utilization of the cowpea grains were identified.

Among them are the time consuming and labour intensive process of dehulling the grains in making some popular cowpea dishes e.g. Akla and Moimoi and for making cowpea flour for other uses.

Following this initial survey, the next stage of the project was directed to using technology to lessen the labour involved in dehulling the cowpea grains to make paste or to produce flour of good keeping quality.

The exercise aimed at using a dehulling machine to dehull the dry grains so as to replace the tedious traditional processes of soaking and manually rubbing off the hull from the grains taking several hours to accomplish and then sun drying for days before grinding into flour, which in the end has only a short shelf life.

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However, this traditional method of making cowpea flour despite its limitations, produces flour devoid of hull which enhances good whipping quality that results in desired sponginess of the product for which it is used.

As such the development of the dry mechanically dehulled cowpea flour was directed to meeting similar qualities and to be comparable in functional properties to the traditionally processed flour.

Tests including sieve analysis to determine suitable grain size and studies on texture, whipping ability in relation to hull content, foam capacity and stability, water and fat absorption of the product were conducted.

The ultimate objective of this basic research was to produce a standard cowpea flour of good keeping quality to be readily available for household and commercial uses.

The initial research yielded satisfactory results of flour which upon sensory evaluation was acceptable to consumers, and could also store under room teperature for more than six months.

The logical follow up then was to produce the flour on small scale for test marketing to determine its retail cost and viability as an introduction to commercialization.

This phase of the project was funded by the Valco Fund of Ghana which also provided a vehicle to facilitate trekking from Accra to the project site in Ohawu, a distance of 180 kilometers.

This report records the experiences of the test market and the lessons learnt as the base for the follow up works recommended in the reports.

It is noted that this exercise is very important as part of research into product development, especially under the circumstance where there is no original or direct linkage with industrial organizations or agencies and commercial institutions that can readily accept the results for production and sale. It is therefore imperative for research scientists engaged in new product development to also undertake studies in viability of the product and its initial promotion in order to attract enterpreneurs to its commercialization. Until this is done, research results will be of little or no benefit to the development programme.

DR. (MRS) FLORENCE EFUA DOVLO
PROJECT LEADER AND CO-ORDINATOR.

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EXERCISES ON COWPEA FLOUR PRODUCTION AND SALES - 1988

INTRODUCTION

Cowpeas are popularly cooked in the grain form and to some extent processed into flour to make some snack food, the most popular of which is 'Akla' (fried cowpea).

The traditional process of making the flour is tedious and involves soaking and manually dehulling, sun drying and grinding. The Economics and Utilization Division of The Food Research Institute (FRI) has taken as a research project, the development of a mechanically dehulled cowpea flour to alleviate the drudgery in manual process and to make readily available cowpea flour of acceptable quality for household and commercial uses.

In order to promote the sale and use of the flour and to assess its acceptability and viability, the Food Economic and Utillization division of the Institute has been producing the flour since 1986 on a small scale to test its sales potential.

A team comprising of a production and sales officers were assigned the duties to:

1. Study the procurement of cowpeas with refrernce to the seasonal production of the crop.
2. Study the right packaging material for the flour and appropriate unit of sale.
3. Study the consumer response to the product regarding the price and its impact on sales.

The team was also responsible for the maintenance and upkeep of the mill.

This report is an exercise conducted to find out how economically viable the cowpea flour could be by identifying the relationaship between the demand and supply positions and the consumer acceptance of the product with regard to price per unit of package.

Three main areas were identified for study. They were:

1. Production of the cowpea flour with emphasis on the procurement of cowpeas.
2. Brandingand packaging in affordable units and
3. Demand Creation and the Sales Trend.

PRODUCTION OF THE COWPEA FLOUR IN 1988

The year, 1988 was selected for this exercise because compared with previous years, there was a constant supply and retailing of the product at the institute throughout the year. Secondly, unlike the previous years where only about 100kg. of cowpeas were purchased for the production of the flour per trip, an average of 278.75kg. per trip was procured for the year and thridly it was the year where a test marketing was conducted in 2 shops in Accra.

Four trips were made to Ohawu where the mill is sited a distance of about 180kms. from Accra on the Aflao road, to produce cowpea flour for the exercise.

PROCUREMENT OF COWPEAS FOR THE EXERCISE

Arrangements were made with the Crops Research Institute Substation at Ohawu to cultivate cowpeas to feed the mill but weather failures could not favour this arrangement. Attempts made to get the

the local farmers to produce also failed due to the same reason. For this reason, reliance on the open markets (Akatsi and Agbozome) whereby purchases were made at random was the only alternative. The price from the open markets ranged between ₵100.00 per kg. and ₵184.00 per kg.

A total of 1,115kgs of cowpeas were purchased for the exercise for the year. The breakdown is presented in the table below.

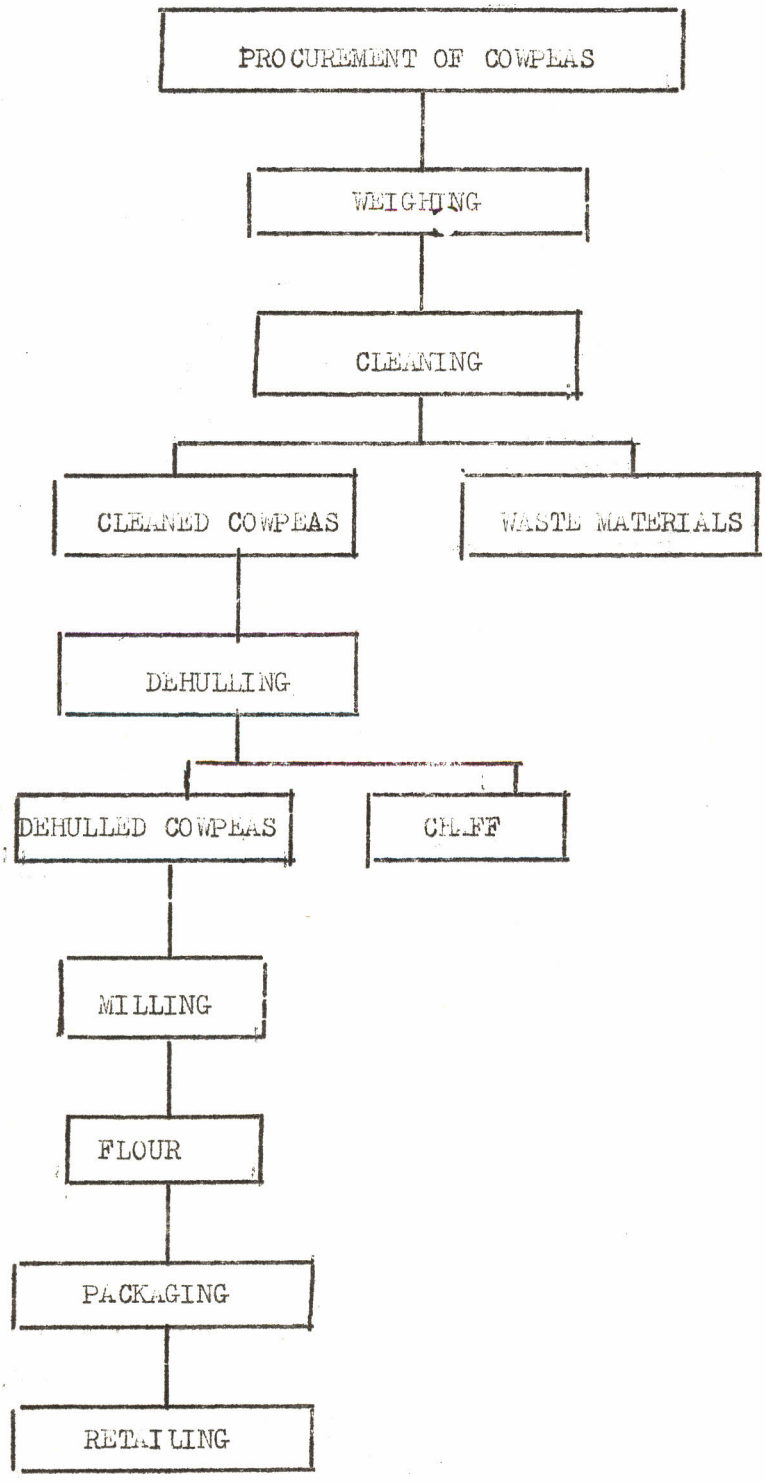
TABLE 1 COWPEA PURCHASES FOR 1988

MONTH	QTY OF COWPEA PURCHASED	PRICE/KG	QTY OF COWPEA USED KG	QTY OF FLOUR PRODUCED KG	%RECOVERY
February	600	₵100.00	300	190	63.3
June	-	-	300	187.5	62.5
October	150	₵184.00	150	94.0	62.6
November	365	₵140.00	365	222.0	60.8
Total	1,115		1,115	693.5	62.3

It could be seen from the table above that the large quantity of cowpea purchased in February had to be milled in two batches. This was due to lack of storage place for the flour.

The process of the production of the cowpea flour involves weighing, cleaning and dehulling the grains and then milling. It is packaged and retailed.

EXHIBIT 1 CHAIN OF COWPEA FLOUR PRODUCTION



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In preparation prior to the operation, the cowpeas are purchased from theopen market and water obtained from a dam about 800 metrees away to fill the drums which serve the lister engines. The plantroom is cleaned and the engine serviced.

Because of the deteriorating state of the mill, the quantity of cowpeas processed per day average 101.36kg as can be seen in table. II below. The breakdown of the bulk cowpeas and the quantity used per day are also presented for easy study.

TABLE II

MONTH	QTY PROCESED	NO. OF DAYS TAKEN	QTY./DAY
Feb.	300	3	100
June	300	3	100
Oct.	150	2	75
Nov.	365	3	121.66

CLEANING: Cleaning of the grains in the seed cleaner is done after the grains had been weighed. The seed cleaner separates the waste materials from the bulk grains and the cleaned cowpeas are collected through a spout.

DEHULLING: The dehulling process involves feeding the cleaned grains into the hopper and allowing it to enter the carborendum discs chamber where it is retained closed for about 5 minutes. The exit is then opened to allow the dehulled cowpeas out and collected by placing a bowl to the exit. The chaff from the dehulled cowpeas is also collected by tying a sack to the duct which the chaff flows through.

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FIG I: Periodic supply of cowpea flour to the sales officer 1988

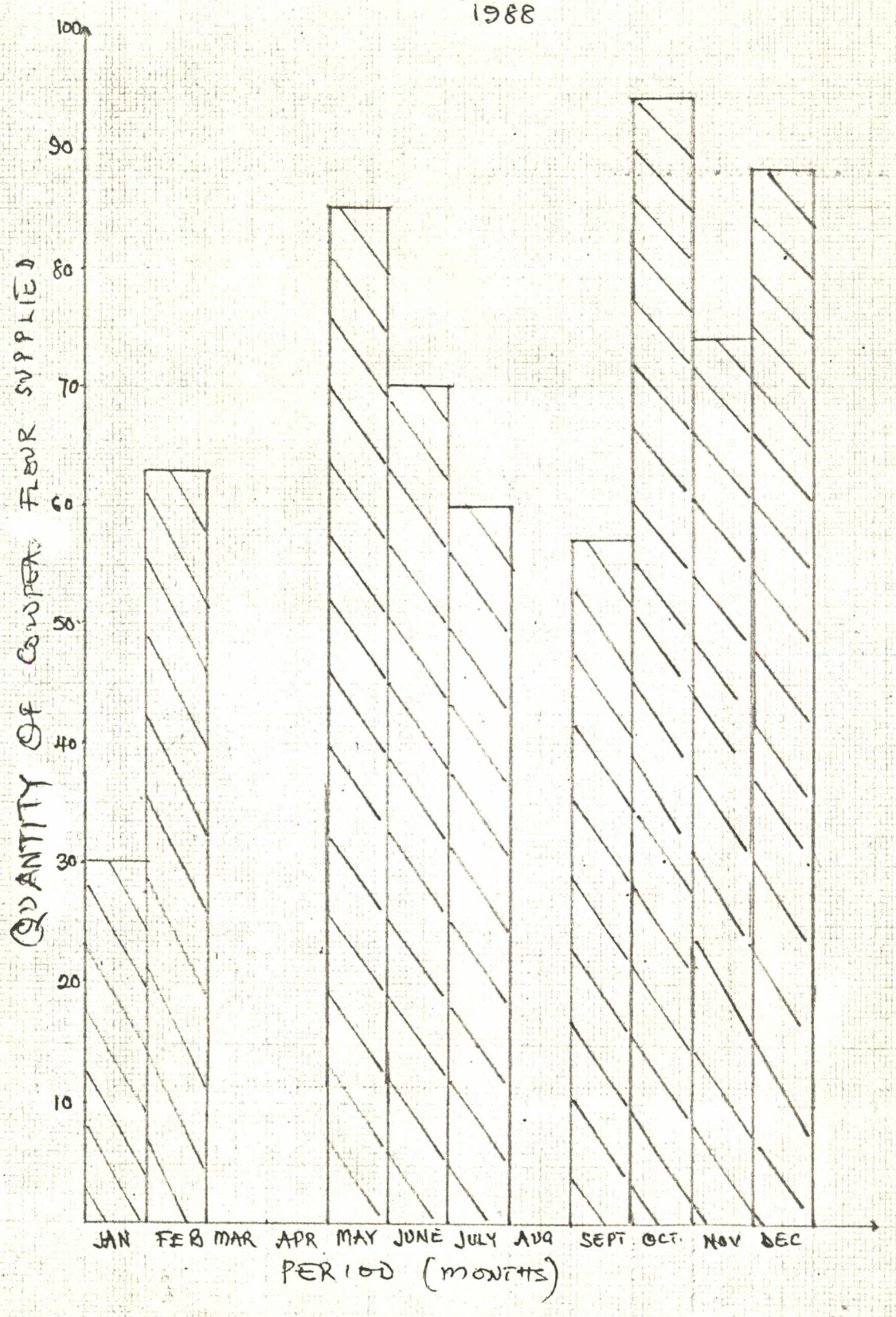


Fig II: A component bar chart showing the rate of recovery of cowpea flour – 1988

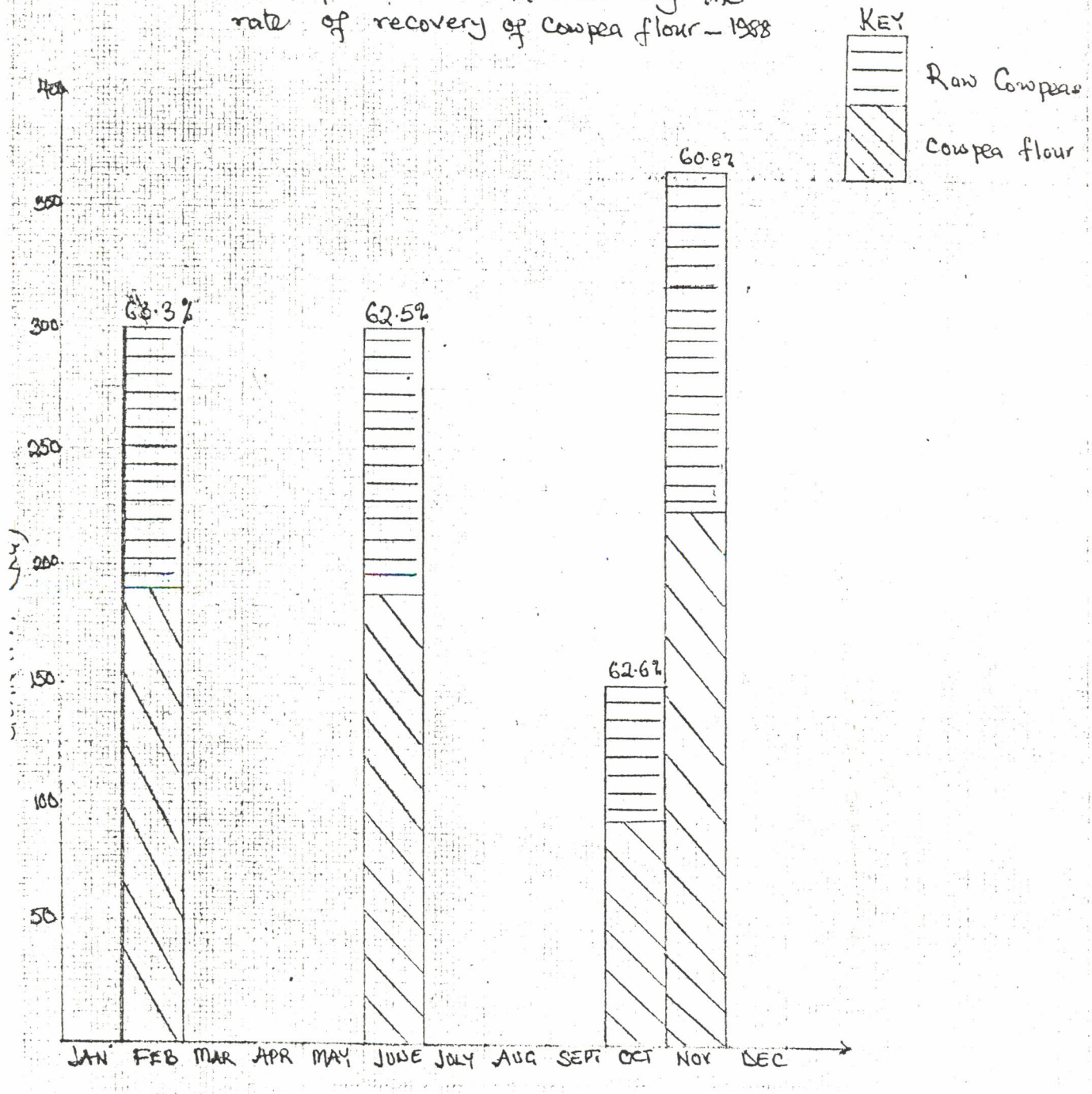


FIG III Variation in sales for 1988

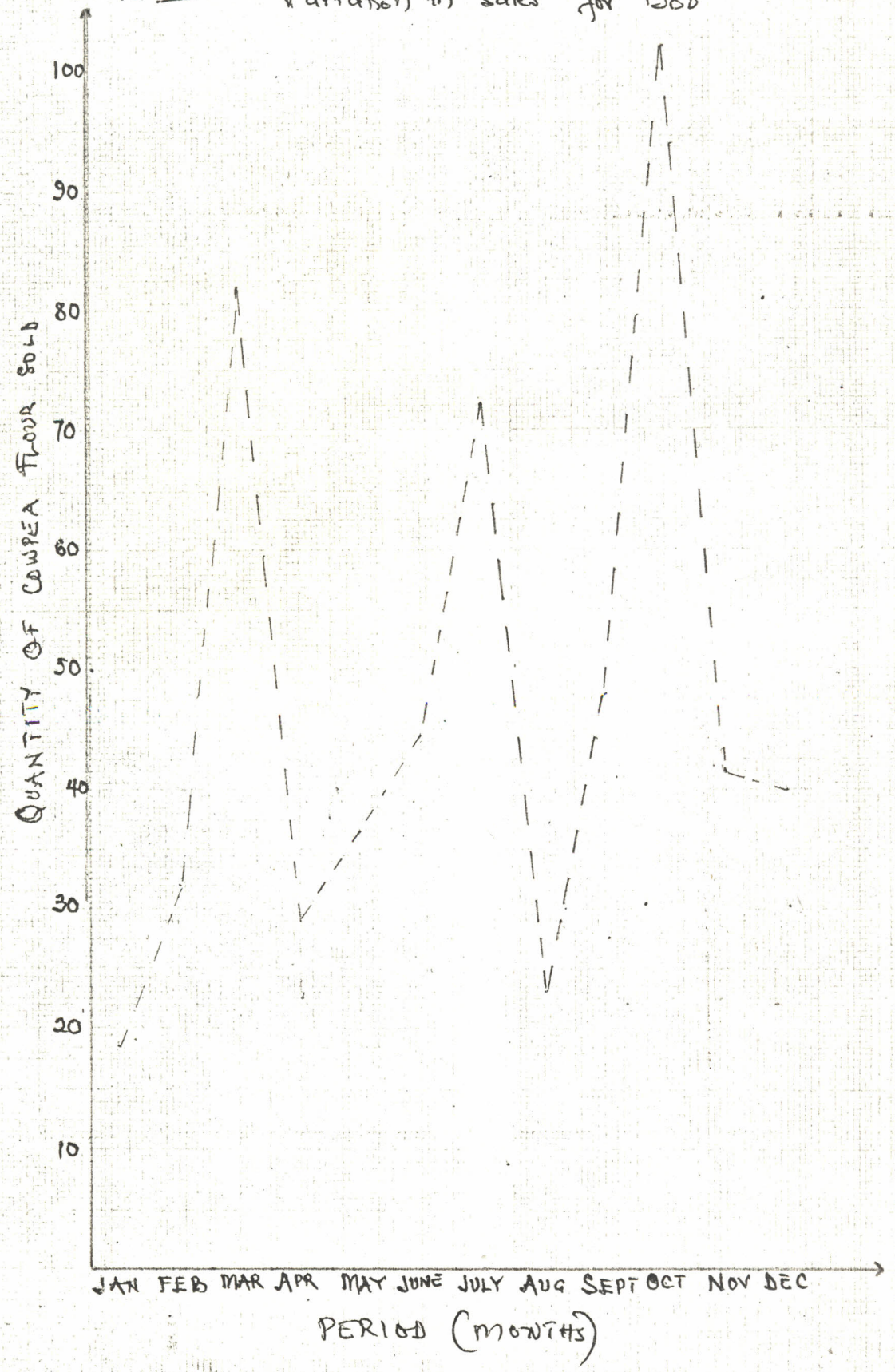
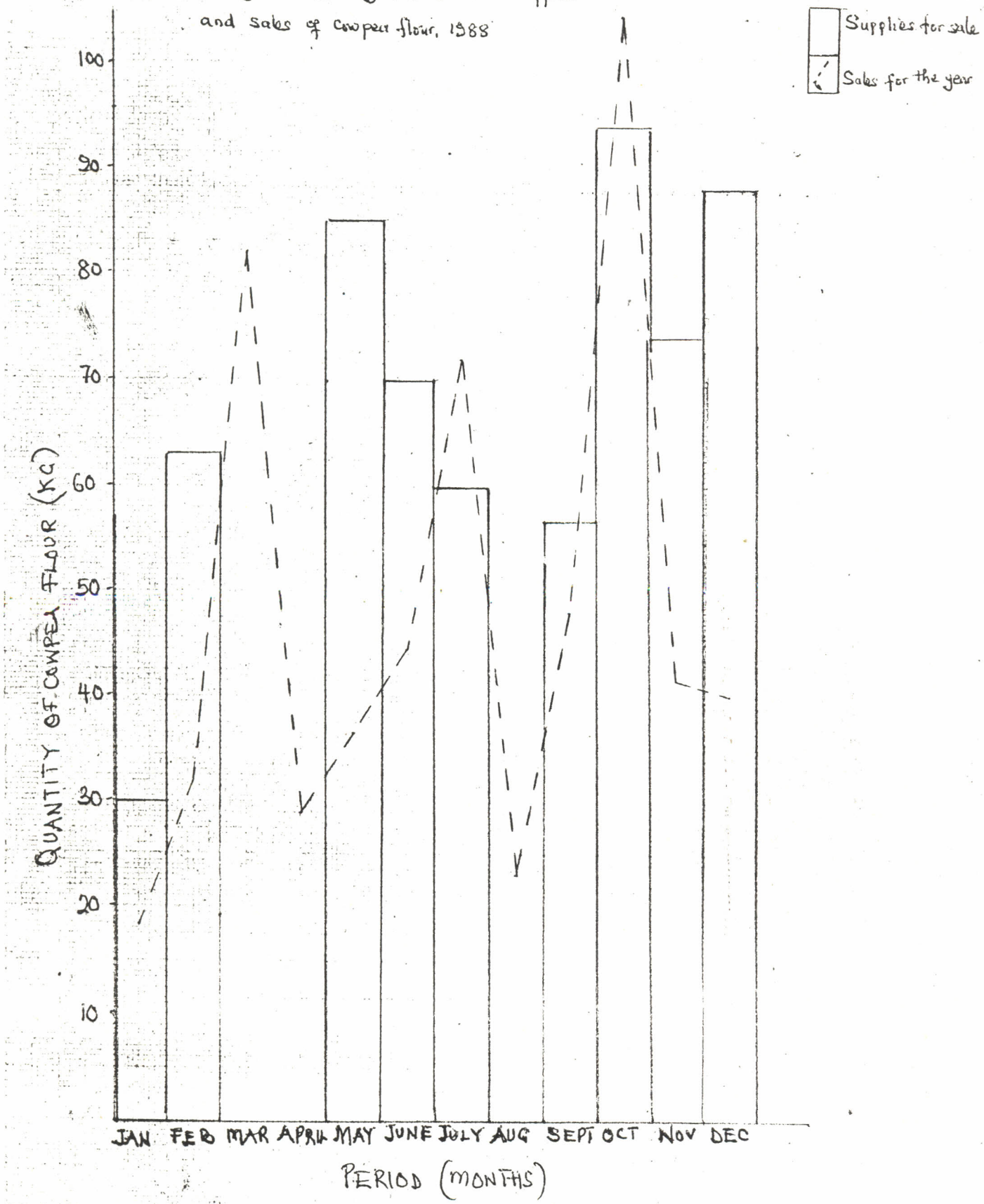


Fig IV - Diagram showing variation in supplies and sales of cowpea flour, 1988



MILLING: The dehulled grains are milled using the local corn mill as an alternative to the hammer mill at Ohawu. This is because the sifter has a lot of exits which allow flour to escape thus polluting the plant room and making the milling process difficult.

Milling has been in small batches. The highest quantity of flour produced and bagged was in October and the least was in January 94kg. and 30kg. respectively. See Fig. 1 for the quantities of grains milled at a time.

A total of 693.5kg. of flour was produced in the year which represented only 62.3% of the grains purchased (refer table *). The chaff, foreign bodies like pieces of cowpea shells and stones as well as some of the grains that spilled over constituted the difference of 37.3%

PACKAGING: The flour was originally packaged in units of 1kg. each and kept in a cupboard for sale at the Food Utilization Office of the institute. Prior to the commercialization exercise, the flour was largely used for demonstration purposes at hopitals, clinics, maternity homes and to the general public. It was later recommended that the flour be packaged into affordable units of 500gms.

SALES The sale of the product has been low because of its distribution which was intentionally restricted. Fig. III shows variations in sales for the year. For example in the months of February, May and December, the demand for the flour was less than 50% of the quantity produced. (as shown in Fig. IV). As. such, the 600kg. of cowpea purchased in February had to be processed in two batches. The sale of the first batch of 300kg. of cowpeas processed took up to June to complete.

The remaining 300kg. processed in June also lasted till October. (see Fig. II). In October however, the demand for the flour increased by 8%. This was a result of the Food Utilization and Preservation show organised by the Ministry of Agriculture which lots of recipes were pepared from the cowpea flour and exhibited.

DEMAND CREATION

This area of the exercise was aimed at finding how best the product, the price, the place and the promotion of the marketing mix which are referred to as the 4p's can affect the demand for the cowpea flour.

1. THE PRODUCT

From a series of research, the cowpea flour was developed and branded, 'High Vegetable Protein Flour'. The research into the production of cowpea flour as already mentioned was directed to replacing the tedious, daily, manual production of paste with flour which can store and be readily available for use. A list of recipes for which the flour can be used has been compliled into a booklet entitled - formulation and utilization of the cowpea flour, 1979 by the staff of the Food Utilization section of the institute.

2. PACKAGING AND BRANDING

Work on the Design of a package material as well as creating a brand name for the cowpea flour started in 1985. The artwork for the packaging material with the label printed on it was designed by the Ghana Marketing and Advertising Company and the block work was made by the Graphic Corporation. Attempts to get the Poly-products, Ghana ltd. and the Union Carbide to produce the polythene bags with the label on them failed. As such, paper labels were produced as an alternative.

In January, 1988, this packaging material was modified to involve the use of 2 ploythene bags and inserting labels in between the two bags. This was found to be uneconomical and time consuming.

With these difficulties, a new package was explored. The Direct Art service was finally able to produce a 'show-your-product' package with the design and nutrition information printed on it. The cowpea flour was introduced to the market in February, 1988 during the 1988 Indutech fair in the new package. However with time, the writing on the package was found to be peeling off. For the export of the product, an area in which some people expressed interest during the fair, this packaging material was regarded as substandared and has to to replaced.

3. PRICING

Pricing of the cowpea flour was based on the cost in producing it and it is a major determinant of its demand. Of the two main pricing strategies that exist for setting prices which are:

(a) the skimming strategy, which is done by setting high prices coupled with high promotional activities and

(b) the penetration strategy which is setting low prices to attract buyers and create mass market, the penetration strategy was adopted for the sale of the cowpea flour to ensure that more people can buy the product.

In addition to these strategies, four main pricing polices that could also be applied are:

(a) Cost plus pricing which is calculating the total cost in production plus some percentage of profit. The resulting figure becomes the price for the product.

(b) Target Pricing which is setting prices that would give a specific rate of return on investment.

(c) Demand Oriented Pricing where the price is based on the level of demand and

(d) Competitive Pricing which is setting prices on the basis of what competitors are charging.

With these alternatives to price setting, the project adopted the cost plus pricing with a varying percentage of profit so as to ensure a stable price. However rising cost of the cowpeas also caused a rise in the selling cost from ₡150.00 per 500gms to ₡200.00 per 500gms.

In October during the Food Preservation and Utilization Fair, the demand-oriented pricing policy was adopted. The price of ₡200.00 per 500gms was raised to ₡250.00 per 500gms. but as demand became very weak as a result of the increase, the price was brought down again to ₡200.00 per 500gms. Item C8 of Table IV shows the percentage profit margin earned on each of the four operations.

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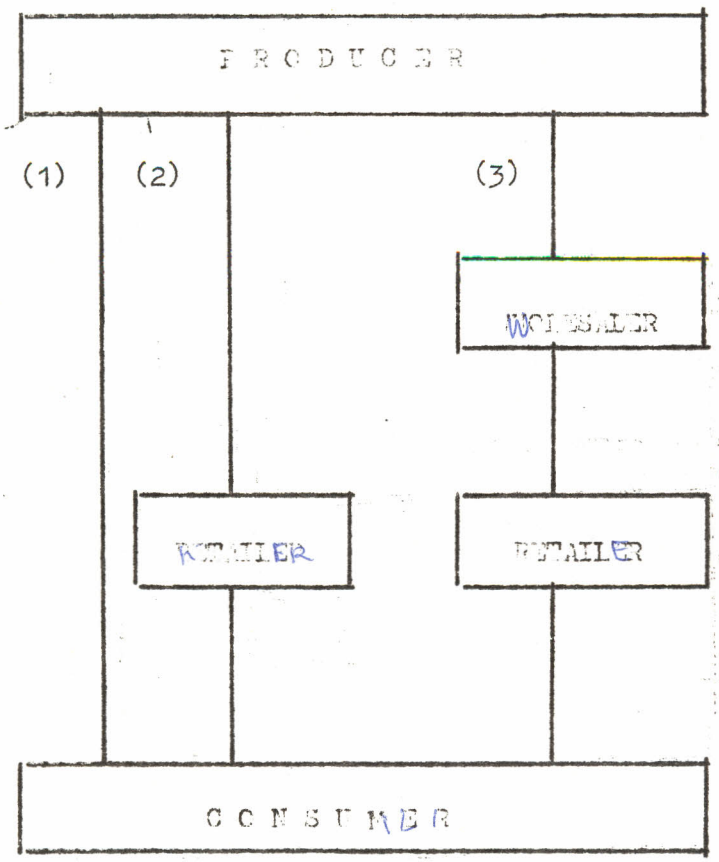
The Place In any distribution system, three channels are open for adoption.

EXHIBIT II



(1) Direct distribution to the consumer

(2) The introduction of a retailer and

(3) From the producer through a wholesaler to the retailer and finally the consumer.

See Exhibit II.

Other methods of selling include:

(1) Personal selling (2) Correspondence (3) Telephone

(4) Exhibitions (5) Mail order selling.

For our study, the cowpea project adopted a method of direct selling to the consumer to associate the Food Research Institute with the cowpea flour. And also to create awareness of other products developed at the institute. For the sale of the cowpea flour, two methods were adopted :

(a) Personal selling and

(b) Exhibitions

(a) Personal Selling. A sales Officer at the food Utilization section was responsible for retailing the cowpea flour to the public. Except for the months of March, April and August, there

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were periodic supplies of cowpea flour to the sales officer. The quantity supplied at a time was between 30kg. and 94kg. (see Fig. II for details).

Consumers mostly the ultimate users of the product called at the Food Research Institute - buying centre to buy the flour which were sold in units of 500gms.

Table II below shows the sales operation for the year 1988

TABLE II SALES OPERATION FOR 1988

DATE	QTY SUPPLIED KG.	QTY USED FOR PROMOTION		QTY SOLD AT AMT PAID TO ACC.	
22/1/88	30	kg	Cost	¢300/kg	accounts ¢
		-	-	30	8,700.00
15/2/88	63	5	1,500	58	17,400.00
12/5/88	85	0.5	150	84.5	25,300.00
22/6/88	70	-	-	70.0	21,000.00
29/7/88	60.5	2	600	58.5	17,550.00
15/9/88	57.0	-	-	57.0	17,100.00
19/10/88	94.0	18	7,416	76*¢412	33,364.00
17/11/88	72.5	0.5	200	72kg*400	28,800.00
20/12/88	88.0	-	-	88	35,200.00
Total	620.0	26.0	9,866		204,414.00

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Generally, even at our level of production, sales were quite slow. In previous years, commercial processers were buying the cowpea flour for 'akla' making and this meant bulk purchases were then made by them. As the price of the flour which has always been a determinant of demand shot up, these 'akla' processers gave up the purchase of the flour. Purchases have since been made by individual consumers.

(b) Exhibitions. Exhibitions combine two basic functions. By exhibition, the product is shown and its main features are communicated to the consumer and interest generated and orders placed for the product.

The cowpea flour was exhibited during the last 2 fairs and the aim of the participation was to introduce the flour and its uses to the general public. Sales for the months of March, June and October went up as can be seen in Fig. II owing to the exposure of the flour at the fairs. 23kg of flour was used for promotional purposes during the fairs organised in the year (refer table III).

(4) Promotion and Advertising

An indirect form of advertising using the newspapers and the radio was employed in advertising the cowpea flour. This was to defray the huge expenditute involved in advertising. This indirect form of advertising the cowpea flour took the form of interviews on the radio, reports in the newspapers on the cowpea flour project and exhibitions.

In June, a radio interview was granted by the production officer which was geared towards making the flour known. Demonstrations carried out at the Police Hospital, Korle Bu and Adabraka Polyclinic were all to create awareness to the public of the cowpea flour.

Test marketing was also carried out in 2 shops - Multistores on the High street and Top-In-Town Supermarket at Osu. The aims for the test marketing were two fold:

(1) To bring the product out of Food Research Institute for attention catching and

(2) to assess consumers interest in the flour

(3) to find out t e shelf life of the product outside the institute and any other information relevant as a guide for commercialization

Personal contacts were also made to introduce the cowpea flour to some prospective users like the Ambassador Hotal, the Regional Maritime Academy and the Medical Officer In Charge of the Children's Hospital.

Obesevations

From the study conducted into the cowpea flour operation in 1988 which was directed to finding out how best the cowpea flour could be marketed at a profit, the following observations were made:

1. High production Cost of The Cowpea Flour

This was attributed to the following reasons:

For the first place, purchasing of cowpeas for the production of the flour was made irrespective of the season and this resulted in an unstable high price of the cowpea flour.

Secondly, the quantity of cowpeas purchased at a time was very low and this was due to lack of storage place both at Ohawu for the cowpea grains and at Food Research Institute for the milled cowpeas.

Thirdly, the amount of chaff produced after dehulling is observed to be enormous. About 30% chaff. If this could be reduced. the recovery of the flour would be more and that could reduce the price of the unit cost of the flour. This point confirms the inefficiency of the dehuller.

A fourth point observed in the production of the flour is with the hammer mill. The sifter has a lot of exits which allow substantial amount of flour to escape which also causes a great deal of loss. It became necessary to use the ordinary corn mill as an alternative with satisfactory results.

Packaging

Although the new packaging material looked attractive, the writing started peeling off with time. This deiscouraged potential customers who were interested in exporting the product. This observation was further confirmed in the test marketing in the two shops where the design and writing on the package had completely peeled off within two months on the shelves due to handling by customers.

Microbiological examination conducted on the flour recovered from one of the shops after a period of nine months revealed no pathogenic or indicator organisms. The flour was then found still safe for use

Cooking tests also showed no change in the whipping capacity of the flour. Likewise, there was no change in the taste, colour texture and sponginess of the product.

3 Distribution

The distribution policy adopted whereby the only buying centre was FRI, did not yield good resutls. Potential consumers without means of transport found it difficult to locate the place. This was one of the main reasons for the slow moving of the product.

The test marketing conducted in two shops in Accra was an indication that too many people have not heard of the cowpea flour. This raises a need for advertising and sales promotion.

4. Advertising and Sales Promotion

The indirect advertising made on the radio in the from of interviews and the write up on the cowpea flour in the national papers has made very little impact.

Participation at fairs and demonstrations to some extent exposed the product to the public. However, it is obvious that with intensified advertising and promotion, sales valume would go up considerably as indicated in Fig. I during the fairs held between March and October.

Recommendations for Action

In view of these problems, the following recommendation are made:

1. Modification of the machines

A periodic servicing of the machines as well as some modification would be made in 1989 to reduce the excessive loss due to the depreciation in the machine. In connection with this, a familiarization tour was made in December by a team comprising the production officer

and some members of the engineering division of the Institute. Measurements were taken to elongate the length of the spouts to both the dehuller and the mill so that the dust could be blown out of the plantroom through galvanized pipes.

2. The second action that would be taken will be in the areas of intensive advertising and sales promotions. This approach admittedly is quite expensive, therefore a less expensive plan of visiting prospective customers, such as the hotels and catering institutions as well as stepping up visits to hospitals and poly-clinics with the aim of promoting and effecting sales would be used. Demonstrations on television would be added to the radio discussions.

The Food Ultilization section would be charged the responsibility of organising training programmes in the preparation of various dishes using the flour for the following institutions:

a. Staff of the Nutrition Division of the Ministry of Health.
b. Extension officers of the Ministry of Agriculture and
c. Matrons from the Educational institution

Action already taken

1. Action had already been taken with respect to the packaging material. In view of the problems associated with the former design, a new packaging material has been designed to replace the old one. Efforts are being made to put this into use during the next production year.

2. A letter has also been written to the formers in Ohawu through their chief farmer in connection with bulk purchasing of cowpeas direct from them during the peak season.

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Follow Up Action

The following are proposed as a follow up action:

1. Materials needed for the modification and servicing of the plant would be purchased.
2. In view of the importance of the dehuller, the request to the University of Science and Technology and the Industrial Research Institute for the fabrication of the dehuller as a separate unit would be pursued.
3. Efforts would be made to purchase cowpeas direct from the farmers during the peak harvesting season as against the previous practice of buying from theopen market.
4. It is proposed to approach the Food Research Institute management to release the 'ice-water canteen' which is no more in use to be converted to serve as a store-room for the cowpea grains and the flour. It is envisaged that this will ensure a constant supply of flour.
5. Test marketing of the product which was carried out in 2 shops was not adequate enough to give a realistic buying situtation for commercialization. Five more shops will be added to the existing ones. Two will be added to those in Accra, two to be located in Tema and one at Abor in the Volta Region.

REMARKS:

(1) The initial capital of ₵124,310.00 put into the operation yielded a net profit of ₵46,340.00 an equivalent of 23.8% Table IV showing the cowpea flour operations in 1988, indicates that the greater the quantities of cowpeas purchased and processed into flour, the more profits could be generated.

(2) The production and marketing exercise carried out though limited in scope has revealed that the cowpea flour could be a profitable venture to any enterpreneur if undertaken on a grater commercial scale.

(3) Although the result of the test marketing of the cowpea flour is not conclusive, the attempt to carry the product of research work through the production and marketing of it is a demonstration that research should not end with only writing a report, but should be brought to its logical application so as to attract enterpreneurs. It is also clear that institutions especially the Food Research Institute could generate supplementary funds to support its other research programmes.

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TABLE SHOWING COMP EA FLOUR OPERATION
JANUARY - DECEMBER 1988

TABLE IV.

PARTICULARS	FEB.	JUNE	OCT.	NOV.	DEC.
A: Preparation					
1. Date of the trip	9th-12th	31st-3rd	11th-12th	9th-12	14th
2. No. of staff for the trip	3	3	4	3	3
3. No. of days spent	3	3	2	3	-
4. Amount received for the trip	¢124,900.	18,000.00	38,960.00	61,600	-
B. Production					
1. Cowpea purchased	600kg	-	150kg	365kg	-
2. Quantity dehulled	300kg	300kg	150kg	365kg	-
3. Quantity recovered and milled	200kg	204kg	97kg	253kg	-
4. Actual quantity recovered after bagging	190kg	187.5	94kg	222kg	-
5. Percentage of recovery	63.33%	62.3%	62.66%	60.87%	-
C. Expenditure					
1. Price per kg of raw cowpeas	¢ 100.	¢100.	¢184.	¢140.	-
2. Total amount of cowpea purchased	30,000.	30,000.00.	27,000.00	51,100.	-
3. Gasoil/Engine oil used	27,700.	6,900.00	5,860.00	2,250.	2,250
4. Total night allowance	5,850.	5,850.00	5,200.00	5,850.	-
5. Cost of packaging material	30,000.	3,750.00	1,880.00	4,660.	-
6. Other cost	690.	2,380.00	300.00	2,400.	-
7. Total Production cost	43,040.	48,830.00	40,840.00	61,600.	-
8. Percentage profit margin	22.2	12.2	-22.4	30.6	
D. Revenue					
1. Unit cost/kg	226.52	260.69	434.46	264.37	-
2. Selling price/kg	300.00	300.00	400/500	400.00	-
3. Expected revenue	57,000,00	56,250.00	40,300.00	88,800.	-
4. Net profit or loss	12,310.00	6,820.00	7,480.00	27,200.	-
5. Actual amount paid to accounts as at 20/12/88	55,350.00	55,650.00	33,360.00	64,000.	-

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