PRELIMINARY STUDY OF CONSUMER PREFERENCES FOR COWPEA VARIETIES IN THE VOLTA REGION OF GHANA

BY

FLORENCE EFUA DOVLO

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(C.S.I.R.)

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WE ARE SIX

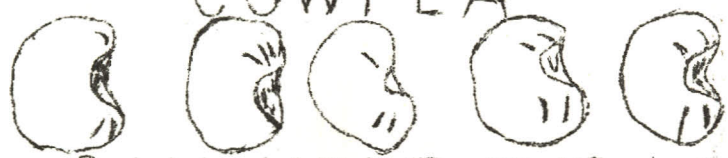
WE HAVE ONE

HERRING FOR OUR STEW

IT IS TOO SMALL FOR US

ADD ME I AM

COWPEA



I CAN HELP THE HERRING

BUILD YOUR BODY

AND GIVE YOU BLOOD

HOME EXTENSION PROGRAMME
MINISTRY OF AGRICULTURE
GHANA.

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I wish to record my appreciation and thanks to all those who helped in the conduct of the survey and in the preparation of this report.

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SUMMARY

Characteristics that are preferred for cowpea (Vigna unguiculata) are colour appeal, quick cooking, increase or swelling capacity, binding quality, and ease of dehulling for processed foods.

Of the thirteen different types used in the study, the LV09 which is cream coloured and slightly rough skinned, scored well for almost all the qualities mentioned. The only disadvantage it has is its heavy weevil infestation soon after harvest.

For combinations with rice or maize, the brown types are preferred to break the monotony in the colour of the dish.

The binding quality, though important for plain cooking and for combinations with the cereals, is not particularly suited for stews. Cowpea types that remain grainy after cooking are rather desired for stews and soups.

Cowpea Consumption

Cowpea is consumed by all the respondents in one form or the other. Contrary to expectation, the respondents in whatever educational or social class, eat some cowpea dish frequently. It is not a taboo to any of the respondents nor is it considered a poor man's food. The contention therefore in some literature that cowpeas or legumes in general are low prestige foods, is certainly not world wide and cannot be accepted as true of Ghana.

However, it is found that the different cowpea dishes have some social status. For example, cowpea stew is a favourite dish among the educated respondents.

Processing

The main constraints in the use of cowpea are related to the processes necessary for some of the delicious and easily digestible cowpea foods such as Akla and Moimoi. The drudgery of removing the husk from the grains and grinding often on a stone, because the local mill cannot take small quantities, limit home preparation of these foods.

Cowpea flour is produced for use in making 'Akla' only by small scale processors. As indicated by the respondents, the prospect for commercial production of cowpea flour is great. It is obvious that the production of the flour will facilitate ready preparation and frequent consumption of cowpea foods.

Preference for Cowpea Types

In order of preference for colour, the LV03 is first choice. Generally the brown types are preferred for colour. The LV03, because of its reddish colour, is assumed to contain iron for blood. The whitish type LV09 is somehow associated with anaemia and is suspected of not having as much nutrients as the red or brown ones. For taste however, and also for quick cooking and increase capacity the LV09 is the first choice.

Popularity of Cowpea Dishes

It is noted that not all the cowpea dishes listed in the questionnaire are known in every area. There is therefore, need for promotional activities to popularize the different cowpea dishes throughout the country.

Storage Problems

The major problem experienced by all respondents, is weevil infestation. Although some work has been done on the control of weevils, with some success, it seems the results are not being used by farmers possibly because of lack of communication.

PRELIMINARY STUDY OF CONSUMER PREFERENCES FOR COWPEA VARIETIES IN THE VOLTA REGION OF GHANA

INTRODUCTION

Chapter I

In countries such as Ghana, where protein malnutrition is a major problem, the use of legumes as a cheap protein food is constantly stressed in nutrition extention programmes.

Legumes have appreciable quantities of protein ranging from 20-25 gms per 100 gms. However, the quality of legume protein based on its Amino acid pattern, is low, having a score of 53% compared to 100% for egg. Fortunately the sulphur containing Amino Acids - Methionine, Cystine and Trytophane which are short in legumes are in sufficient supply in cereals. Likewise the lysine in which cereals are also deficient, is abundant in legumes. Therefore, where these foods are used in combinations, they supplement each other to provide a high protein diet.

A study of the traditional diets, show that legumes have long been used in combination with cereals and or with meat or fish. However, the consumption of legumes has been and is still very little.

The National Food and Nutrition survey conducted in 1961/62 (1) showed that on the average, 6 grammes of cowpea was consumed per person per day.

In a recent nutrition survey conducted at Adzen Kotoku in the Greater Accra Region (2), it was found that leguminous foods largely cowpea dishes are consumed mostly by school children, In this regard too, the contribution of legumes to the protein in the diet of children in the survey sample was estimated to be 5.9%. For adolescents it was found to be 3.9% and for adults 2.4%. However an F.A.O. estimated average consumption figure for Africa, South of the Sahara was 40 gms. daily per person (3).

Considering that even an addition of 60-90 gms. of legumes to rice or maize* does not provide the required NDp cals of 8% for such vulnerable groups as children and pregnant and nursing mothers, the legume consumption reported in these surveys is indeed very small.

The Extension Division of the Ministries of Health and Agriculture are engaged in extensive education on more uses of legumes as supplements to insufficient meat or fish. This extension aid on the frontispiece illustrates the effort being made in this direction.

The reason for the low consumption even though cowpea is a relatively cheap protein food may be due to some difficulties that are experienced in the use of cowpea as food or to other unknown factors.

Available research work on cowpea, concentrated on problems of storage, production and yield. No attention is so far given to the problems in the household utilization of cowpeas, although the problem of heavy weevil infestation cannot be disassociated from its low consumption. Apart from this, there are indeed other consumer problems and opinions about its use which should be investigated.

Cowpeas commonly referred to as beans, are the most popular of the leguminous grains used in Ghana and that is eaten in a variety of ways. But while some cowpea dishes are very popular in some parts of the country these same ones are unknown in other areas. Therefore studies and documentation of the various forms in which cowpea is used for food in different parts of the country will certainly enhance its consumption and popularity.

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* See Appendixes 6A & 6B

Cowpea Production: Compared with the cereals and the starchy crops, cowpea is produced in limited quantities despite its importance in nutrition. The reason for this is attributed to its poor yield coupled with the high rate of insect infestation resulting in serious waste. For these reasons, the cowpea is given less prominence in the farmer's programme and is produced only as a subsidiary crop, even though the crop has an attractive cash return relative to labour. (4)

Varieties: Notwithstanding these limitations the consumer has a large variety of cowpea to select from. There are different shades and sizes and varying characteristics of cowpea available in the markets for the consumer to choose from. Some of the types have good swelling capacity and binding quality, others have colour appeal while some are preferred for their taste or quick cooking or ease of dehulling for processed foods.

On the part of the consumer a study of the properties of the different types will aid the selection of cowpea for a particular dish. Besides, a study of cowpea for food is imperative in the effective promotion of cowpea consumption.

1.1 Objectives

The main objective of this survey is therefore to collect and analyse information on consumer preferences for the varieties of cowpea that are available in Ghana. This information will be linked with the protein content, and possibly the production yields of each type cooking performances of these types, as an aid to agronomists in deciding on the type to promote. Specifically the survey aims at the following:-

(a) To study the characteristics that make for the choice and use of a cowpea type for the preparation of a particular dish.

(b) To examine cultural and social factors in the consumption of cowpeas.

(c) To collect and analyse information concerning household difficulties in the use of cowpea.

(d) To assess the extent in which cowpea can form the bases for cottage industry for processed cowpea flour as a means for preserving cowpea as well as easing labour in the preparation of cowpea dishes.

(e) To study methods of cowpea processing and range of foods produced from cowpeas, and to develop other cowpea food products.

(f) To study home storage methods and examine the possibility for improvement.

(g) Finally to document the various forms in which cowpea is used in the diet throughout the country.

1.2 The Study: The Northern and Volta Regions of Ghana were originally selected for the study. These regions and the Upper Region are known to be the largest producers of cowpeas.

In particular the Volta Region is noted for the production of different varieties of cowpea. By reason of its proximity as well, the initial study was concentrated in the Volta Region. Only a small sample study was done in and around Tamale (Northern Region) with the help of two technical assistants from Northern Region Department of Social Welfare and Community Development.

This report is therefore based largely on the findings in the Volta Region.

The Volta Region: The Volta Region lies in the south Eastern part of Ghana. It has a population of 947,268* people. Over twenty ethic groups are represented in the Region. These groups speak different dialects of the Ewe language. In some areas however, the languages spoken are quite different and so are the culture and food habits.

Economic Activity: Fishing along the coast, and farming in the forest areas and trading, constitute the main economic activities in the Region.

Selected Towns: The towns included in the survey represent the major ethnic groups in the Volta Region and cover the Southern, the Central and Northern areas.

The areas surveyed are grouped according to their location and similarity in culture and food habits.

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* 1970 census.

Southern - consisting of Keta, Abor, Agbozume and surrounding areas.

Central - Kpetoe, Ho and Kpando.

Northern - Jasikan and Krachie.

TABLE I

NUMBER OF PEOPLE INTERVIEWED IN EACH AREA

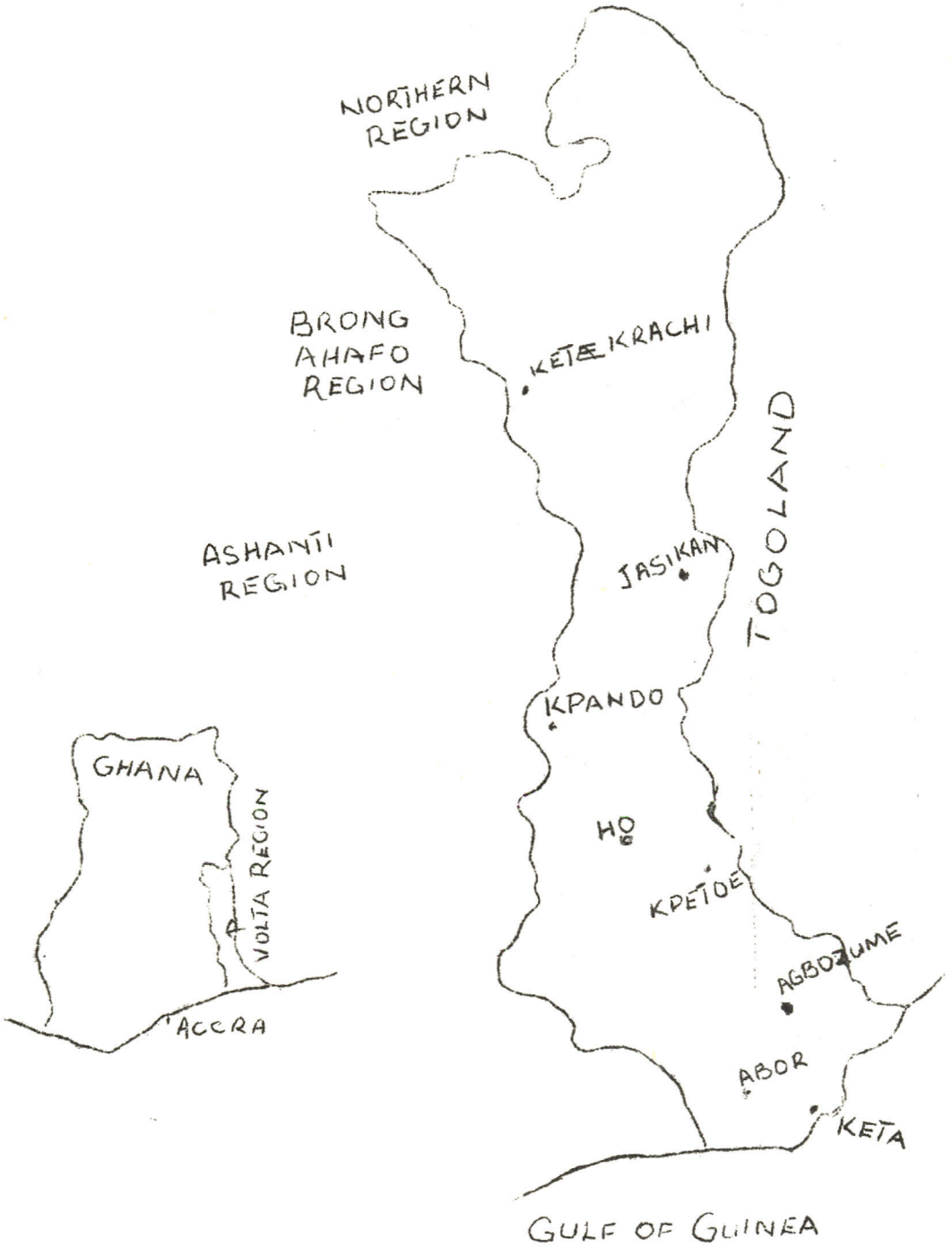
AREA	MALES	FEMALES	TOTAL
Southern	50	199	249
Central	76	281	357
Northern	54	210	264
TOTALS	180	690	870

TABLE 2

THE MAIN TOWN OR TOWNS
REPRESENTING EACH ETHNIC GROUP

TOWN	ETHNIC CLASSIFICATION	NUMBER INTERVIEWED
Keta	Anlo	79
Abor	Avenor	89
Ho	Asogli	153
Kpetoe	Agotime	115
Kpando	Akpini	89
Jasikan	Buem	130
Krachie	Buem	134
Agbozume	Some	81

MAP OF THE VOLTA REGION SHOWING SURVEY AREAS



1.3 Preparations

In preparation for the survey, questionnaire forms were designed according to information required. The co-operation of the Department of Social Welfare was sought for their field staff to serve as enumerators. A letter was written to the Director of Social Welfare, Ho, explaining the purpose of the study and the areas intended to cover. This co-operation was readily offered. A visit was then paid to Ho, the regional capital to meet the senior staff and to discuss the objectives of the study and the questionnaire.

The next visit was to meet the field staff that was placed at my disposal for the survey. Twenty social welfare extension workers were drawn from various areas of the Volta Region to participate in the survey with one senior officer as a supervisor. The areas for the study were selected with the help of the supervisor.

A one day briefing course was conducted for the enumerators at which the purpose of the survey and the questionnaire were explained. Each enumerator was made to fill in the questionnaire so as to be acquainted with any difficulties and for clarification of any misunderstanding of the questions.

The problem of dealing with the diversity of cowpeas available in the Region was raised and discussed. At first, each enumerator was advised to collect the varieties in a particular area into a sectioned polythene bag for the study and to submit it with the completed forms. This was found to be too difficult to tabulate and did not make for uniformity in analysing the results.

Later, the questionnaire itself was revised and made more comprehensive. The varieties of cowpea collected from all over the Region were conveniently packaged into plastic bags so that each enumerator had the same pack of the different types of cowpea for the survey. [redacted].

Thirteen different types of cowpeas based on grain colour and size were first collected and packaged for the study. During the course of the survey however, more varieties were collected making a total of twenty-two. The latter nine were not included in the study. The interviewing was done at random and not based on any statistical selection.

Information

Informations obtained included :-

1. Background of the respondents such as level of education, age, occupation, number of child dependants and marital status.

2. Data were collected on the extent of cowpea consumption preference for the various types; ceremonial or special uses of cowpea; popular cowpea dishes, processing techniques and domestic preservation of cowpea.

3. Interviews were conducted among a limited number of processors of cowpea products to assess the viability of this small scale industry. In particular, to study their choice of cowpea types for the products and to study their processing and preservation problems.

Sample

A total of 180 men and 690 women were interviewed. Although men may not have a say in the selection of the type of cowpea that is cooked for meals, they may definitely have preferences for the colour and taste of a particular type. It is therefore, curious to know what their likes are.

Chapter 2

BACKGROUND INFORMATION ON RESPONDENTS

I. In assessing the results of the survey, certain variables that are likely to influence the choice and consumption of food generally, and specifically in this study - cowpea consumption, are taken into account. The variables that are considered, are the respondents' educational background, marital status, age, occupation and number of child dependants.

2.1 Educational Background

Majority of the respondents have no formal education. Out of the total number of 870 only 322 representing 37% of the number have had some formal education. The break down, according to males and females and the level of education in each case, is presented in Table 3 and 4.

TABLE 3

EDUCATION OF RESPONDENTS ACCORDING TO SEX

	MALES		FEMALES	
	Number	%	Number	%
Educated	84	46.7	238	34.5
Uneducated	96	53.3	452	65.5
TOTAL	180	100.0	690	100.0

TABLE 4

STANDARD OF EDUCATION ACCORDING TO SEX

	MALES		FEMALES	
	Number	%	Number	%
Elementary	53	63.1	89	37.4
Secondary/Teacher Training	15	17.9	50	21.0
Vocational	6	7.1	65	27.3
University	10	11.9	34	14.3
TOTAL	84	100.0	238	100.0

2.2. Occupation of Respondents

The occupation engaged in by the respondents were grouped into four categories as clerical workers, farming, trading, vocation or profession. Included in the clerical work are those who are typists, telephonists or are engaged in office work. Farmers - those who plant and sell farm produce. Traders - those who sell food and non-food items. Vocationals or professionals include those who are seamstresses, lawyers, civil servants, librarians, etc. The number and percentage of respondents in each occupational group are presented in Table 5.

TABLE 5

OCCUPATION OF RESPONDENTS

NUMBERS AND PERCENTAGE IN THE TOTAL SAMPLE

	NUMBER	PERCENTAGE
Clerical	183	21.0
Traders	226	26.0
Farmers	218	25.0
Vocation/Profession	234	28.0
TOTAL	870	100.0

2.3 Age Distribution

The age groupings used for the survey and the number and percentage of respondents in each group is given in Table 6 below.

TABLE 6

AGE DISTRIBUTION OF RESPONDENTS

	MALES		FEMALES	
	Number	%	Number	%
Below 20 years	25	14.0	110	16.0
21 - 30	34	19.0	118	17.1
31 - 40	36	20.0	134	19.4
41 - 50	33	18.0	125	18.1
51 - 60	32	18.0	105	15.2
61	20	11.0	98	14.2

2.4 Marital Status

Most of the respondents are married. The breakdown according to males and females and the percentage in each case is given in Table 7 below.

TABLE 7

MARITAL STATUS: NUMBER AND PERCENTAGE

	MARRIED		SINGLE		TOTAL	
	No.	%	No.	%	No.	%
Males	96	53.3	84	46.7	180	100.0
Females	560	81.2	130	18.8	690	100.0

2.5 Dependence Load

The average load of dependants on respondents in the survey sample is found to be three. The age groupings, the number and percentage in each age groups are given in Table 8 below.

TABLE 8

PERCENTAGE OF DEPENDENTS AND AGE GROUPS

AGE	NUMBER	%
Under 5 years	908	32.6
6 - 12 years	996	35.8
13 - 15 years	879	31.6

COWPEA CONSUMPTION AND UTILIZATION

Chapter 3

The consumption of cowpea among the respondents, is assessed in respect of their educational background, marital status, child dependency, age and occupation.

The frequency of consumption is stated broadly as frequently or occasionally. Frequently is taken as consumption everyday, and one to three times a week. Occasionally refers to once or twice a month or seldom.

Almost everyone in the survey sample eats cowpea in one form or the other. It is not a taboo to anyone. The frequency of its consumption however depends on the individual's preference for a particular cowpea dish or on factors already mentioned or on others unknown. The search for these other factors is one of the objectives of this study.

3.1 Education and frequency of Cowpea Consumption

Taken for granted that a person's educational background and possibly her knowledge of nutrition will influence her selection and use of food generally, the frequency of cowpea consumption among the educated group in the survey sample is compared with the uneducated. The consumption is further assessed according to the standard of education. The results are presented below.

TABLE 9

EDUCATION AND FREQUENCY OF COWPEA CONSUMPTION

	FREQUENTLY		OCCASIONALLY		TOTAL	
	No.	%	No.	%	No.	%
MALES						
Educated	55	62.5	29	37.5	84	100.0
Uneducated	59	61.5	37	38.5	96	100.0
FEMALES						
Educated	137	57.3	101	42.17	238	100.0
Uneducated	370	81.9	82	18.1	452	100.0

TABLE 10

LEVEL OF EDUCATION AND FREQUENCY OF COWPEA CONSUMPTION EXPRESSED IN PERCENTAGE

	FREQUENTLY		OCCASIONALLY		TOTAL	
	No.	%	No.	%	No.	%
LEVEL OF EDUCATION						
Elementary	87	61.3	55	38.7	142	100.0
Sec./T. Training	36	55.4	29	44.6	65	100.0
Vocational	38	53.5	33	46.5	71	100.0
University	31	70.5	13	29.5	42	100.0

In all the classified groups, the percentage of people who consume cowpea frequently is higher in all cases. However, differences are observed among the educated and uneducated females. This difference does not appear among the males.

3.2 Type of Occupation and Frequency of Cowpea Consumption

Of the four categories of occupation, the consumption of cowpea stands out highest among traders and farmers. The frequency of consumption among the occupational groups expressed as a percentage of the number in each group is presented in Table 11.

TABLE 11

OCCUPATIONAL GROUPS AND FREQUENCY OF COWPEA CONSUMPTION EXPRESSED IN PERCENTAGE

	FREQUENTLY		OCCASIONALLY	
	No.	%	No.	%
Clerks	156	85.3	27	14.7
Traders	205	90.7	21	9.3
Farmers	196	89.8	22	10.2
Vocation/ Profession	174	71.6	69	28.4

3.3 Marital Status and Frequency of Cowpea Consumption

Analysis of results according to marital status show a higher percentage of married people both males and females eating cowpea more frequently, than single people. The details are presented in Table 12.

TABLE 12

MARITAL STATUS AND FREQUENCY OF COWPEA CONSUMPTION EXPRESSED IN PERCENTAGE

	FREQUENTLY		OCCASIONALLY		TOTAL	
	No.	%	No.	%	No.	%
MALES						
Married	83	46.0	54	30.0	137	76.0
Single	25	14.0	18	10.0	43	24.0
FEMALES						
Married	345	50.0	217	39.3	616	89.3
Single	40	5.8	34	4.9	74	10.7

This is possibly so because in general the eating habits of married people are more regular. They may be more eager to prepare many dainty cowpea dishes at home, whilst the single person may not be so keen on preparing such foods for herself alone and may depend largely on what is offered for sale.

3.4 Reason for Liking Cowpea Foods

Two outstanding reasons were given by both the educated and non-educated respondents for their preference for cowpea foods. These are that, cowpea dishes are satisfying; that is they sustain and wards off hunger for a long period and secondly they are nutritionally good. This latter opinion is an indication that even the uneducated are aware of the nutritional value of cowpeas and it is a clear evidence of nutrition education and extension. The percentage of respondents that gave specific reasons in each group is given on page 18.

TABLE 13

REASON FOR LIKING COWPEA DISHES
EXPRESSED AS PERCENT FOR EACH GROUP

	NUTRITIONALLY		VERY FILLING		NO REASON		OTHERS	
	No.	%	No.	%	No.	%	No.	%
Educated	187	58.0	82	25.6	43	13.4	10	4.0
Un-educated	243	44.3	192	36.0	97	17.7	16	2.0

3.5 Prejudices against Cowpea

There is a widespread belief that cowpeas or legumes in general cause digestive troubles resulting in an unpleasant production of gas after their consumption. It is noted that most of the respondents in this survey acknowledged no experience of this. Very few people indeed admitted experiencing it, while some did not answer the question.

If this result can be relied upon, it could only prove as baseless the fear or prejudice against cowpea consumption, and will emphasise the fact that cowpeas properly cooked, contain no toxic substances and no indigestible materials. Indeed, it has been proved that processes such as those used in Ghana in the preparation of some cowpea dishes, for example soaking, dehusking, prolonged cooking and mashing are enough to get rid of any toxic substances and infact enhance digestibility.

3.6 Cowpea Dishes for Different Meals

Cowpea dishes are usually eaten for breakfast and lunch. They are said to be unsuitable for supper because dishes made of cowpea are suspected of causing blown stomach and indigestion.

Breakfast: Plain cooked cowpea served with oil and gari, is a common breakfast meal particularly among workers and school children. This dish is nicknamed 'concrete or foundation' as it is claimed to ward off hunger throughout the greater part of the day. It is a popular vendor food and one most frequently consumed as shown in the survey.

Lunch: A combination of cowpea and rice known as Workye or 'Rice and Beans', a favourite vendor food, is usually sold during lunch period. Workye is largely prepared at home for lunch too.

A very popular lunch menu among the Akans especially, is cowpea stew (simply known as Bean Stew). This stew served with fried plantain is a favourite dish on the menu of resident students. Among students, it is nicknamed 'Red-Red' because the Bean Stew is almost always made with red palm oil and the plantain also fried in red palm oil.

Cooked cowpea mixed with roasted corn meal and made into a thick porridge is occasionally served for lunch. This dish is better enjoyed in a good company.

Snacks: 'Akla' (fried bean paste) is a very popular snack food. However in parts of the Volta Region, it is mashed with gari and seasoned with oil, pepper and salt and eaten for breakfast. Other snacks such as 'Ayibli' are less frequently eaten. This snack is usually served in the afternoon.

In the survey sample, 62 percent of the respondents eat a cowpea dish for breakfast, 33 percent serve it for lunch. The remaining 5 percent eat it at any time, including supper.

It is striking that in the Volta Region, Olele or Moimoi is unknown. This dish which is very popular in Nigeria, is also popular in the Northern Region of Ghana where it is known as Tubani.

Days of Serving: Generally, cowpea dish like any other dish, may be served on any day. In the survey sample however, it is observed that most people cook and eat cowpea dish at the weekends particularly on Saturdays and Sundays. This may be due to the fact that Saturdays and Sundays, not being working or school days, are suitable for such heavy foods. As indicated already, cowpea dishes are said to be filling and therefore ward off hunger for long periods.

3.7 Relative Popularity of Cowpea Dishes

A number of traditional cowpea dishes (see list in Appendix 3) were presented for selection according to frequency of consumption; thereby indicating their relative popularity. The results were analysed for the three areas namely the Southern, Central and Northern areas of the Volta Region.

In all three areas, 'Bobo' also known as 'Yo ke gari'* is most frequently consumed. The rest of the dishes with the exception of only three are fairly popular in all the three areas. The three exceptions are 'Bean Stew' which is little or not consumed in the Southern and Central sections of the Volta Region, but is frequently eaten in the Northern section.

Bean stew is a favourite dish among the Akans. Its popularity in the Northern parts of the Volta Region may be due to the Akan influence. Because the people in this area are very similar to the Akans in their culture and food habits. A dish which is also typical of the Northern section is Gbakusi.* This dish is unknown in the other areas.

Other dishes that are not known are Adayi and Olele or Moimoi. Adayi is a popular cowpea food in the Southern part of the Volta Region but is practically unknown in both the Central and Northern sections.

In all three areas, Olele or Moimoi is not known. In fact, this dish known as Tubani* is a typical Northern Ghana food, and so is Tukuru*. The picture presented in the piegraph on page 22 show the general popularity of the different cowpea dishes.

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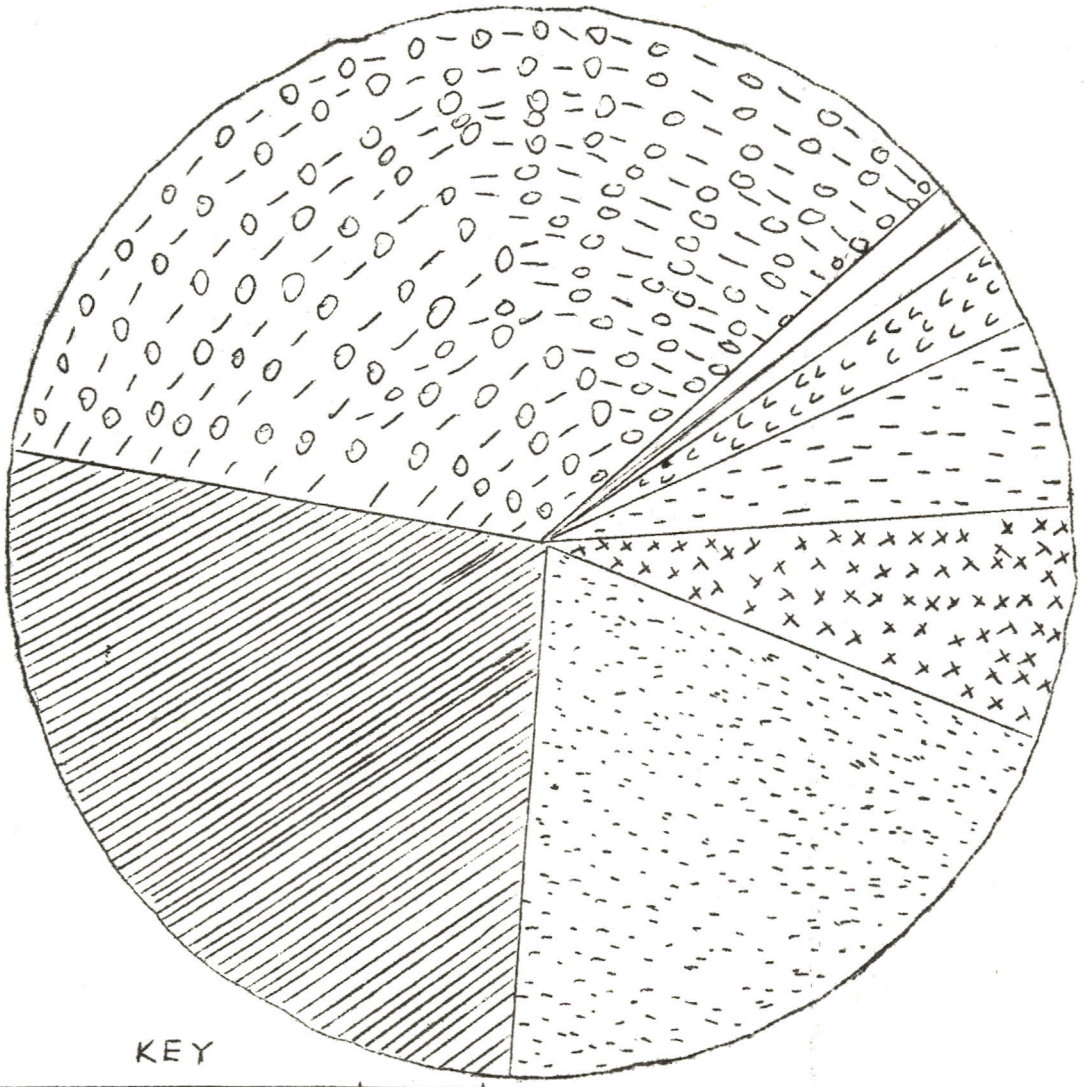
* See Appendix 3

FIGURE ONE

RELATIVE POPULARITY OF VARIOUS COWPEA DISHES



KEY

	BOBO	35·5%
	WORKYE	26·5%
	BEAN STEW	21·2%
	AKLA	7·1%
	TUBANI	6·2%
	AYIKPLE	2·7%
	ADAYI	·4%
	AYIBLI	·4%

3.8 Ceremonial Uses of Cowpeas

Apart from its use for human consumption, cowpea is very much associated with certain ceremonies and functions. Some of these as revealed in the survey are sacrifices, festivals, fasts, funerals and twin ceremonies. In almost all of these ceremonies, the red type of cowpea is used.

The use of cowpea for sacrifice is very common among the Ewes. The cowpea is plainly boiled and mixed with red palm oil and sprinkled before the gods. Sometimes 'Akla' is also used. The Mohammedans practically live on 'Akla' during their fast.

Twins cannot eat a new harvest of cowpea unless a ceremony is first performed. The freshly harvested cowpea is boiled and mixed with palm oil and sprinkled around the house.

Some sections of the Ewe tribe celebrate cowpea festivals as others celebrate 'Yam' festivals just as the Gas celebrate Homowo. The occasion is marked by the cooking and eating of cowpea in every home.

Other ceremonies for which cowpea is said to be used are funerals and christening. The use of cowpea for ceremonies such as mentioned is however known to only about 18 percent of the respondents.

The number of people that have knowledge of these ceremonies as well as the particular dish for each is as follows.

TABLE 14

CEREMONIAL USES OF COWPEAS

CEREMONIES	DISH	NO. OF PEOPLE
Sacrifice	Plain boiled cowpea with red palm oil	68
Festival	" "	42
Fasting	Akla	26
Christening	Workye (Rice & Beans)	13
Funerals	Tubani (Moimoi)	9
Twin ceremony	Plain boiled cowpea with red palm oil	2

3.9 Preference for Cowpea Types

Colour as we know, is very important in culinary art and so in cowpea cookery, the different coloured grains are used to an advantage. The brown grains are used in combination with white rice or maize to break the monotony in the colour of the dish.

The cream black eyed, because of its ease of dehulling and swelling capacity, is used for processed foods such as Akla and Moimoi or Tubani.

On the other hand cowpea used for stew is preferred to remain grainy and not mashy. Properties that are unfavourable in cowpea cookery, include too long cooking time, difficulty in dehulling, unappealing grain colour, grainy texture and weevil infestation.

TABLE 15

THE FIRST THREE TYPES OF COWPEA PREFERRED BY THE RESPONDENTS

CHOICE	COLOUR			TASTE			QUICK COOKING			SWELLING CAPACITY		
1st	LV03*	LV09	LV10	LV09*	LV03	LV07	LV09*	LV03	LV07	LV09*	LV03	LV07
	73	58	51	68	53	49	51	40	37	38	31	27
2nd	LV05*	LV03	LV07	LV03*	LV09	LV10	LV12*	LV09	LV05	LV03*	LV09	LV08
	61	48	33	56	48	45	47	42	38	35	32	29
3rd	LV12*	LV03	LV09	LV12*	LV02	LV03	LV05*	LV03	LV02	LV10*	LV02	LV09
	44	40	37	42	36	27	33	30	28	28	23	18

* First selection

The thirteen different varieties of cowpea used in the study were presented to the respondents to indicate the types and properties preferred.

The colours of LV03, LV05 and LV12 are preferred in this order. For preference according to taste, quick cooking and swelling capacity, the LV09 scored highest. The results presented in Table 15 show the first three types selected by the respondents and the score for each choice.

The first, second and third choices in the over all selection in respect of colour, taste, quick cooking and swelling capacity are presented in Figure 4.

It is noted that for colour, the brown cowpea is preferred to the white black eyed. The LV03 scored first place for colour but was scored second place for taste whilst the LV09 scored highest for taste, quick cooking and swelling capacity.

The brown coloured types of cowpea are generally not easy to dehull and are therefore not much used for processed foods. On the other hand, these brown types are more resistant to weevil infestation.

In favour of LV09, are its ease of dehulling, increase in volume and pleasing taste. But it has the disadvantage of heavy weevil infestation. The LV06 and LV07 are not well accepted because of their dull, unappealing grain colour.

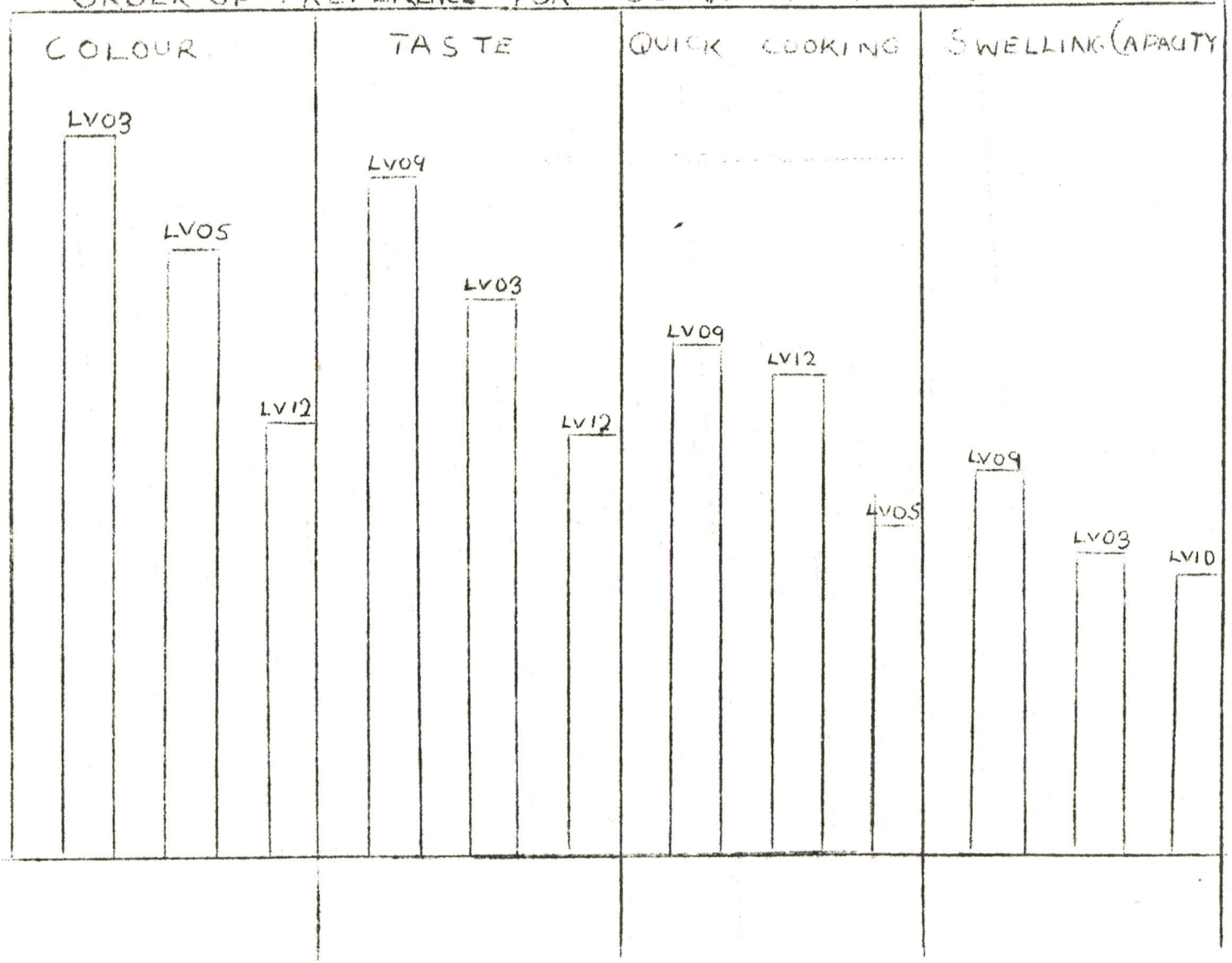
The varieties that are not well known are LV08 and LV11.

The LV08 is a new introduction which is claimed to be high yielding. At an Accra market, this type is being sold at twenty-five pesewas a cigarette tin (approximately 170 gms.) whilst the others sell at twenty pesewas.

According to our test kitchen experiment, (see Table 17) the LV08 has a good binding quality and a good yield after cooking. It is among the first five accepted for colour and taste.

FIGURE TWO

ORDER OF PREFERENCE FOR COWPEA TYPES



Chapter 4 PROCESSED COWPEA PRODUCTS

It is curious how traditional food processing originated. However the reasons for the complex processes used in the making of 'akla' and moimoi are not hard to find.

No doubt the traditional processors had found out through long experience, the effect of the husk on the quality of the food product, and had to devise ways of dehulling the grains.

Indeed, experiments at the Test Kitchen of the Food Research Institute proved that the rising capacity of cowpea paste is greatly enhanced if the grains are dehusked. In other words, the husk reduces the rising capacity of the paste.

Indigenous people therefore have to find ways by which the grains can be dehulled when preparing food such as 'akla' which are preferred to be caky and spongy.

Since the husk is of no nutritional value except to provide roughage, it is wise to remove it, especially when it affects the quality of the food product and retards its digestibility.

Methods: The methods used in dehulling are varied and consist of:

a) Soaking the cowpea grains to soften and rubbing off the skin by hand. Then grinding in a mill or on a stone into paste. Or after removing the husk, the grains are dried thoroughly and ground into flour.

b) The grains are pounded in a mortar, and the husk blown off from a flat tray. They are then soaked to further remove the husk and then ground into paste or dried and ground into flour.

c) A simple process is to grind the cowpea whole and sift.

Methods (a) and (c) are largely used.

Remarks on Processing: It is obvious that the greatest limitation in the use of cowpea for food is the laborious process connected with the preparation of some cowpea products. Processes such as dehulling and grinding are known to be necessary for the quality and digestibility of cowpea products. Plainly cooked cowpea dishes are often blamed for indigestion and gas production.

Therefore, the development of simple gadgets for household processing of cowpea will be very beneficial, particularly when the local mill which is used for commercial processing is not suitable for grinding small quantities. So, for household purposes, the cowpea must of necessity, be ground on a stone and this is by no means an easy task.

The use of a liquidizer is employed in a few sophisticated homes, but this gadget is only useful when grinding the cowpea to make Moimoi or Olele which requires much liquid. The paste for 'Akla' on the other hand, requires less liquid in order to whip to maximum volume. As such, a liquidizer is of no avail. These difficulties bring into focus the urgent need for the development of suitable household gadgets for cowpea processing to enable ready and easy preparation of cowpea dishes and thereby enhance its consumption.

It is becoming important that mere preaching of the nutritional value of foods is not sufficient. Nutrition extension workers must concern themselves with adequate food supply and recipe formulations so as to provide a variety of ways by which recommended foods can be used in the diet.

This aspect of nutrition education regretably, has often been neglected. It is evident in this study that the nutritional value of cowpea is known to both educated and uneducated. What is lacking is the knowledge of the variety of ways by which cowpeas can be used for food. It is therefore important that the many varieties of cowpea dishes found throughout the country

be introduced to areas where they are unknown, and documentation such as this, aims at achieving this purpose.

Suitable recipes for infants using cowpea can be developed and their use demonstrated to mothers. A few examples of suitable infant foods are adayi, moimoi, akla and combinations of rice and cowpea flour, roasted corn flour and cowpea flour. The latter two can be commercially produced to provide a ready mix for infant feeding.

The Food Research Institute is already engaged in the production of a mixture using bambara beans (voandzeia subterranea). The use of cowpea should also be explored.

The problem of dehulling and grinding of cowpea using simple household designs is hereby referred to the food engineers.

4.1 Prospects for Commercial Production of Cowpea Flour

One way by which cowpea can be made available most of the time is to process it into flour. This requires the solution of the problem of dehulling as well as any problem that concerns effective drying of the grains.

The unreliable and humid tropical weather makes drying inefficient. By prolonged drying, the grains are subjected to fermentation.

The dry savannah regions of Ghana are however ideal for sun drying. Fortunately, the production of the LV09 which presents the greatest storage problem, is predominant in these regions. It should therefore, be possible to establish cowpea flour industry in these regions if the industry has to depend on sun drying.

At present, many commercial processors of 'Akla' find cowpea flour convenient to use.

The whole hearted approval by all the respondents for commercial production of cowpea flour is a sure sign of its prospects. Certainly, commercial production of cowpea flour will relieve 'Akla' processors of the drudgery of making it themselves and will make it convenient for housewives to make 'Akla' and other processed cowpea foods readily and frequently.

The flour can also be combined in adequate quantities with rice or maize flour in a ready 'mix' for infant feeding as well as an improved breakfast cereal for adults.

The advantages in the commercial production of cowpea flour are obvious. Steps should now be taken to make it possible.

The Engineering Section of the Food Research Institute has designed a simple drier. This machine can be used in the small scale production of cowpea flour except that it can only operate in areas that have electricity. Consideration should be given to designing one that is practical for rural areas.

Assessment of Cowpea Flour Industry: A simple exercise was undertaken to assess an acceptable selling price for cowpea flour. Five kilograms of cowpea was bought at a cost of four cedis and processed into flour. Fifteen packets of 250 grammes each were realised. ¢2.50 was allowed for labour and fuel costs, making a total expenditure of ¢6.50.

The selling price at:-

40 pesewas per packet	-	¢6.00
50 " " "	-	7.50
60 " " "	-	9.00

It is noted that 250 grammes packet of cowpea flour cannot sell below 50 pesewas for a fairly good profit.

Use of Cowpea Flour for 'Akla': Akla made with cowpea flour is slightly drier when cold than one made with freshly ground paste. This difficulty can be overcome by adding water in small quantities gradually while whipping to incorporate air. This allows for more increase in volume and makes the 'Akla' lighter.

4.2 Small Scale Cooked Cowpea Business

The processes used in making foods such as 'Akla' and 'Moimoi' or Tubani are so cumbersome that for a household consumption, most people find it rather convenient to buy these foods already prepared than make them at home.

For this reason, the making of such foods have generated small scale cooked foods business.

Besides the difficulty in making such foods, there are other factors that contribute to the wide patronage of these vendor foods. These include the convenience of having a food ready to eat; the inability of the local mills that are used for grinding to take small quantities; the lack of culinary art and science most important in making these foods; and above all the strange and widespread feeling that such vendor foods are better tasting than 'home made' ones. Foods that are so regarded include workye, akla, bobo and others such as kaklo and kelewele. One cannot find a ready explanation to this feeling except that in any trade, there is a trade secret. Indeed, successful processing and making of 'akla' and 'moimoi' particularly require the knowledge of the techniques to use. However, the only reason that one may have for buying such foods as Bobo and Workye which require no processing and are simple and easy to make, may be but for the convenience of having food ready to eat.

Opinions expressed by respondents on buying cowpea foods rather than make them reveal that difficulty in the process of making for example 'akla' accounts largely for buying it from vendors. Seventy-five percent, of the respondents mentioned difficulty in making 'akla' as the reason for buying it. 19.8 percent do not know how to make it and 17 percent claimed they know how but cannot make it as good as those sold by vendors.

The convenience of having a "ready to eat food" also accounts largely to the small scale business of cowpea dishes.

The three popular foods that constitute this business are Bobo, Workye and Akla.

The Study: A simple questionnaire study was conducted among selected vendors of these foods noting only daily expenditure on items used in the preparation of the foods and amounts realised from sales, not considering capital expenditure.

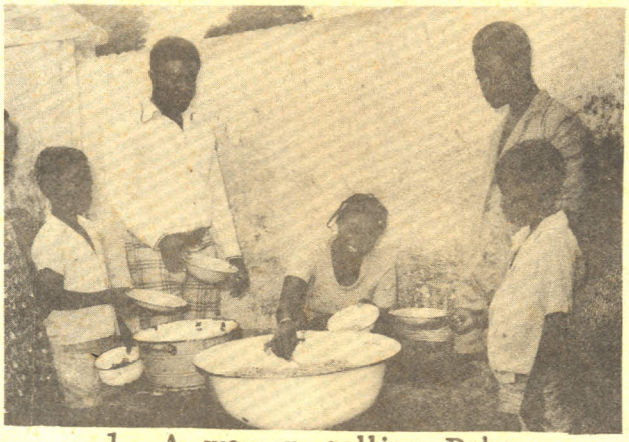
The objective was to study first, the cowpea types that are used or are found suitable in the preparation of these foods and secondly to determine how lucrative the business is.

Bobo or Yoke Gari: The small scale processors of bobo find the types LV09 and LV12 most popular with consumers, followed by LV03 and LV05. They also maintain that the LV09 doubles its quantity and is therefore more frequently used in this enterprise. When weeviled, the other three which often come fresh in season are used.

TABLE 16

ECONOMICS OF SMALL SCALE COOKED COWPEA BUSINESS

Item	EXPENDITURE PER DAY		
	Bobo	Akla	Workye
Cowpea	¢6.00	¢2.00	¢4.00 (4.6 kg.)
Firewood	0.60	0.50	0.60
Oil	1.64	2.16	1.50
Gari	0.70	-	-
Salt	0.05	0.05	0.10
Pepper	0.10	0.10	0.30*(when plentiful)
Onion	0.15	0.10	0.40
Rice	-	-	20.00 (23.0 kg.)
Ginger	-	-	0.25
Small fish	-	-	0.40
Wrappers (leaves)	-	-	0.50
Karannefi (leaf - colouring agent)	-	-	0.60
Kawa	-	-	0.10
Cost of milling	-	0.10	-
Labour	1.20	1.20	0.80
Total	¢10.24	¢6.21	¢30.30
Sales per day	12.80	9.89	35.75
Expenditure	10.24	6.21	30.30
Net Profit	¢2.56	¢3.68	¢5.45



1. A woman selling Bobo

2. Workers buying Workye

3. Mixing cowpea flour for Akla

4. Frying Akla

AKLA BUSINESS

'Akla' is seen commonly carried around for sale by hawkers. Muslims practically live on 'Akla' during their fasts. The Hausa type of Akla is usually made using freshly ground cowpea paste. This of course requires dehulling of the grains and grinding into paste.

For reasons already stated, the cream type (LV09) is mostly used because of its ease of dehulling and grinding. Also possibly because this type of cowpea is predominantly produced in the Northern Regions of Ghana. In the Volta Region however, cowpea flour is largely used. Here too, the grains are dehulled and dried before grinding into flour. For this reason, the LV09 is mostly used.

For simple grinding and sifting into flour, other varieties especially LV12 are also used.

WORKYE (RICE AND BEANS)

The characteristic sweet aroma of the fried pepper, onion and ginger which is served with workye often arouses the appetite of consumers.

The properties of this dish are the binding of the cowpea well with the rice and attractive colour combinations. For these reasons, the brown types of cowpea that also have good binding properties are largely used.

Nevertheless the vendors of this food especially in Northern Ghana, have realised that the cream type (LV09) which makes a rather monotonous combination with rice, has on the other hand good binding qualities and an excellent swelling capacity and is therefore more economical. These vendors use the LV09 and bring about the desired colour of the dish by boiling the cowpea and rice in an infusion of a red coloured leaf known in Dagomba as Karannefi. Mineral salt "potash" known locally as kawa or salt petre is added to speed the cooking and to promote binding of the varieties that do not cook easily or bind well.

Workey business seems to be very lucrative as shown by the result of the study presented in Table 16.

Chapter 5 COWPEA STORAGE

Very little cowpea storage is done in the home because the quantity of cowpea that is purchased for household consumption is usually just enough for short periods (about half to one kilogram at a time). As such, no special containers or devices are used to preserve cowpea at home.

Commonly, enamel or plastic bowls, calabashes and clay pots are used as containers. These containers do not usually have tight fitting lids. A few people who have deep freezers buy cowpeas in large quantities when they are fresh and store them after quick boiling. Deep freezing or even simple cold storage is very effective in preserving cowpeas. But this measure is not practicable in many homes.

The fresh life of cowpea, particularly, the LV09 which is most preferred for its taste, quick cooking and ease of dehulling, is unfortunately very short. It's thin skin coat which makes it easy to dehull also renders it to weevil penetration. This type of cowpea presents the greatest problem of storage.

The red and the shining brown skin types have harder coats which are not easily penetrated by the weevil larvae. Effective cowpea preservation is indeed a problem of great concern to many crop scientists. A lot of work has been done on post harvest loses which has been estimated by John Rawnsley (5) to be about 20% and by P.A. Kuranchie (4) to be between 20-30%. This heavy loss is recognised to be due largely to weevil infestation, and measures for control of the loss have been researched into by many crop scientists.

John Rawnsley in his research at the Crops Research Station, Pokoase, Ghana, found that the traditional practice of storing cowpeas in their pods in woven baskets, and shelled only when required for sale or consumption, is very effective. He noted that the loss in the 'basket storage' was much less than losses which occured in shelled cowpeas that were kept in jute bags and that the little loss in the traditional method was due to damages to pods which were opened through handling (5).

This observation has been explained to be probably due to the difficulty of the hatching larvae to penetrate the cowpea testa. The basket storage although found to be effective, has the inconvenience of having to shell a quantity of cowpea each time it is required.

One of the control measures recommended by Rawnsley is called 'in bag fumigation'. This method by which the shelled cowpeas are bagged and fumigated immediately, was found to be very simple and inexpensive. The gas treatment penetrates the cowpea grains to destory on the onset, the weevil larvae. For, cowpea weevils are known to lay their eggs on the pods right on the fields, at a stage when the cowpea surface is soft enough to allow the tiny larvae to penetrate easily.

This method, using ethylene dibromine capsules was devised as far back as 1969. Immediately after the fumigation, the cowpeas were packed in one pound polythylene bags and sealed with a heat sealer for retailing. A marketing trial was said to prove very successful and profitable.

The use of ethylene dibromine has been approved by the United Nations' Food and Agriculture Organisation as safe. The only precautionary measure recommended for its use is to store the grains for ten days before selling.

With this result, it should be expected that cowpea infestation could be brought under control. But up till now, the problem is still with us and cowpeas sold in our markets are often heavily weeviled. The reason for the non-use of this measure by farmers or wholesallers of cowpea should be a matter for investigation.

Possibly, lack of effective communication of research results to 'user agents' may account for the slow progress being made in weevil control.

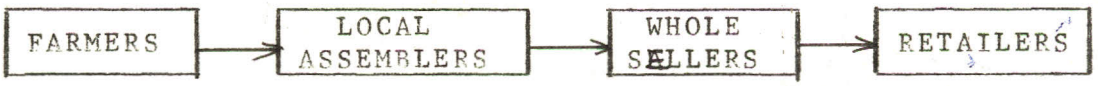
Other investigations may concern the ease of dehulling after fumigation, in particular, the effect on cowpea type LV09 which is the only one easy to dehull.

The problem of cowpea storage has to be looked at, for the purpose of wholesalling and retailing. The consumer can avoid buying the cowpea when it is heavily weeviled. But the small scale cowpea food processor may find it economical to buy the bulk when in season and store for use. She has to contend with the problem of weevil infestation if the cowpea is not treated.

From the study, cowpea food processors too have no special equipment of storing the cowpea to prevent weevil infestation. The quantity of cowpea purchased is kept in the jute bag or in any of the containers previously mentioned.

In the Northern Regions of Ghana, some special effort is made to preserve the cowpea at home. The grains are kept in clay pots and covered tightly with ash. This measure is known to preserve the grains for at least three months. However, this too is not effective if the weevil larvae are already produced.

According to cowpea distribution channels shown below, it should be possible for either the farmer or the local assembler to apply weevil control measures. But I understand this is only done for maize and not for cowpeas.



Chapter 6 TEST KITCHEN EXPERIMENTATIONS

The opinions obtained from the survey on the characteristics that make for the selection and use of the different cowpea types, were further examined and tested at the Test Kitchen of the Food Research Institute.

Cooking tests were conducted on the different types of cowpeas collected, noting particularly the time taken by each to cook, the quantity of water required and the increase in volume after cooking. The cooked cowpeas were later evaluated for appearance and taste. Other tests conducted include ease of dehulling and assessment of cowpea flour industry.

6.1 Cooking Test

One hundred grams of each type of cowpea was cooked using an electric stove regulated at No.3. Percentage increase after cooking was determined. The degree of doneness and the physical state after cooking were assessed according to traditional household cooking techniques and testing. Each type was allowed to cook until it could mash between the fingers and much of the liquid evaporated to desired state.

The total quantity of water used as indicated in the table was added gradually as and when required until the grains were soft. Testing was done intermitently. The result of the cooking test is presented in Table 17.

TABLE 17

COOKING TEST ON THE VARIETIES OF COWPEAS

Type	Dry Wt. of cowpea	Qt. of Water	Time Taken	Cooked Weight	Increase	Comments
	gms	litre	hrs	gms	%	
LV01	100	1.3	2hrs. 35mins.	203	103	Remains grainy.
LV02	100	1.2	2 " 30 "	205	105	Slightly binding but not mashy.
LV03	100	1.8	3 " 5 "	200	100	Fairly binding, imparts colour to saucepan.
LV04	100	1.7	3 "	210	110	Slightly binding, but remains grainy.
LV05	100	1.4	1hr. 50mins.	251	151	Binds well, has nice flavour and colour.
LV06	100	2.0	3hrs. 25 "	241	141	Remains grainy, has an unappealing colour; stains saucepan.
LV07	100	1.7	1hr. 55 "	257	157	Binds well, colour changes from dark grey to nice brown after cooking.
LV08	100	2.0	2hrs. 30 "	230	130	Binds well, has good flavour and acceptable colour.
LV09	100	1.0	1hr.	214	114	Colour changes to darker cream after cooking.
LV10	100	2.9	3hrs. 5 mins	260	160	Binds slightly, remains in grains. Has unattractive colour.
LV11	100	1.7	2 " 25 "	242	142	Does not bind. Soft but remains grainy.
LV12	100	1.3	1hr. 40 "	255	155	Binds fairly well. Has nice colour.
LV13	100	1.5	2hrs. 20 "	252	152	Binds a little.

Observation: It is observed that for some of the types, the amount of water required for cooking to doneness and the time taken, are directly related to the increase capacity.

A classic example is the LV10 which takes 3 hours 5 minutes to increase to 260 grams cooked weight, an increase of 160 percent. This observation does not however apply to others like the LV03 which also took 3 hours 5 minutes to increase to only 200 grams cooked weight. It is only the LV09 that took 1 hour to cook well with an increase of 114 percent.

Comments on Cooking Test: The different types of cowpeas have characteristics that are suitable for particular dishes.

For plain cooking and for combinations with rice or maize the binding quality is important. However, regardless of its excellent binding quality, the cream type, (LV09) is not particularly liked for combinations with rice or maize, as it produces a monotonous colour dish. The brown types are preferred for such combinations.

For stews and soups, the brown types are preferred and it is desired that the cowpeas remain in grains after cooking. Those brown types that do not bind but remain grainy are therefore suitable for use in stews and soups.

The results of this cooking test serve as a useful guide in the selection of the type of cowpeas suitable for a particular dish.

6.2 Organoleptic Assessment of the Cowpea Varieties

After the cooking tests, the samples were subjected to sensory evaluation. The panelists were drawn from the Food Research Institute's staff and consisted of both senior and junior members of staff. The scoring was done using the following marks in order of preference: 6, 5, 4, 3, 2.

The tables that follow show the first five preferences for colour and taste for: A. All panelists; B. Among males and females.

TABLE 18

A. ORDER OF PREFERENCE FOR COWPEA COLOUR AND TASTE

Position	COLOUR		TASTE	
	Type	Score	Type	Score
1st	LV13	78	LV09	73
2nd	LV05	63	LV13	37
3rd	LV08	57	LV12	34
4th	LV09	46	LV02	31
5th	LV12	35	LV03	24

B. PREFERENCE AMONG MALES AND FEMALES

Choice	MALE		FEMALE	
	Colour	Taste	Colour	Taste
1st	LV13	LV09	LV13	LV09
2nd	LV05	LV05	LV08	LV13
3rd	LV09	LV12	LV05	LV03
4th	LV08	LV02	LV12	LV08,10&12
5th	LV12	LV13	LV02	LV02 & 11

Preference Among Males and Females: It is observed that both males and females have the same choices for colour of the cowpea types. The only difference is in the order of preference (see Table 18(b).

For taste however, the females have a wider selection. Even in this regard, all the types except one (LV05) are preferred by the females as well as the males.

6.3 Economics of the Varieties

In order to relate the economics of cooking each type to the increase in volume, the increase percent has been calculated on one hour of cooking taking the LV09 as standard. The result is presented in Table 19.

TABLE 19

ECONOMICS OF THE DIFFERENT VARIETIES OF COWPEAS

Varieties	Quantity Gms.	Estimated Time Hour	Increase - %
LV01	100	1 hr.	43.3
LV02	100	"	45.6
LV03	100	"	32.7
LV04	100	"	43.3
LV05	100	"	100.6 4th
LV06	100	"	43.3
LV07	100	"	101.3 3rd
LV08	100	"	56.5
LV09	100	"	114.0 1st
LV10	100	"	52.5
LV11	100	"	63.0
LV12	100	"	110.7 2nd
LV13	100	"	69.0 5th

It is noted that the LV09 is the most economical in the use of fuel. At one hour of boiling, it is well cooked and has increased 114 percent in volume (Refer Table 17). Others that are also economical include LV12, LV07, LV05 and LV13.

6.4 Ease of Dehulling the Different Types

The different cowpea types were assessed at the Test Kitchen of the Food Research Institute for ease of dehulling.

Method: Fifty grammes of each cowpea type was soaked in 200 ml of water for 20 minutes and attempt made to remove the husk by rubbing the grains between the fingers. Prior to this, the cowpeas were soaked for only 10 minutes. It was found that only the LV09 was easy to dehusk. The soaking time was then increased to 20 minutes. The liquid was drained off and measured. The difference between the quantity of water used for soaking and the quantity drained, accounts for the liquid absorbed. The soaked grains were weighed to determine weight increase and this is expressed in percentage. Later warm water was used to determine its possible effect on dehulling the grains. But the use of warm water did not facilitate the dehulling of the difficult types either.

The result was that, of all the thirteen varieties, the LV09 is the only type that could be dehulled by simply rubbing between the fingers after 10-15 minutes of soaking (see Table 20).

It is no wonder then that the LV09 is the type mostly used for processed foods.

TABLE 20

EASE OF DEHULLING THE DIFFERENT TYPES OF COWPEAS

Type	Qt. of Cowpea	Water for soaking	Period of soaking	Water absorbed	Water absorbed	Wt. after soaking	Increase	Ease of dehulling
	gms.	ml.	min.	ml.	%	gms.	%	Comments
LV01	50	200	20	15	7.5	90	80	Could not peel.
LV02	50	200	20	15	7.5	90	80	"
LV03	50	200	20	10	5.0	70	40	Hard to peel.
LV04	50	200	20	10	5.0	70	40	Difficult to peel.
LV05	50	200	20	20	10.0	85	70	A bit loose but could not peel off.
LV06	50	200	20	25	12.5	80	60	Loose but could not peel off.
LV07	50	200	20	10	5.0	70	50	Hard to peel off.
LV08	50	200	20	20	10.0	90	80	Hard to peel.
LV09	50	200	20	30	15.0	100	100	Peeled easily.
LV10	50	200	20	10	5.0	90	80	Could not peel off.
LV11	50	200	20	15	7.5	70	40	Could not rub off.
LV12	50	200	20	25	12.5	95	90	Fairly soft but difficult to peel off.
LV13	50	200	20	20	10.0	70	40	Husk fairly soft but difficult to peel off.

Chapter 7 GENERAL REMARKS AND RECOMMENDATIONS

The study has been most interesting and revealing. It brought out the many varieties of cowpeas available in this country and presented characteristics and qualities that are desired of cowpea for the different cowpea dishes.

It was interesting to observe the close similarities between preferences for cowpea types by the respondents and preferences of our special panelists at the Food Research Institute. The choices by the respondents in the survey sample compare favourably with those of the panelists.

Cooking tests at the Test Kitchen also confirmed the types that are said to be quick cooking and have great swelling capacity. Refer Figure 4 and Table 17.

The experiments on ease of dehulling, quick cooking, swelling capacity and economics of the various types of cowpeas serve as a useful guide in the selection of cowpeas for the different dishes. The study also unfolded the many different uses of cowpeas in the diet and brought out the need for popularising these in all areas of the country.

One important outcome of the survey is the need for the development of suitable equipment necessary for the processing of cowpea to enhance its digestibility and frequent consumption. It also became clear that more recipes and mixtures of cowpeas and other foods have to be developed to make maximum use of cowpeas. In this respect, I must mention the efforts being made at the Food Research Institute and the Department of Food Science, University of Ghana, to improve the protein content of some of our staple foods.

Quantities of cowpeas are being added to kokonte and kenkey with fairly good prospects for their acceptance.

Consumption of cowpea is known to be very small and so also is its production.

It has been estimated that uninfested quality of cowpea available per head per year for the population of Ghana is 13-15 kilograms (4). This works out to be 33-41 grammes per person per day. (Reckoned on people one year old and above in the 1970 population census of Ghana).

Any campaign for increased consumption of cowpeas then, should be supported by a positive action for increased production and weevil control as well.

Recommendations for further work

1. More detailed studies of the functional properties of popular cowpea types.

2. Quantitative consumption studies among selected groups e.g. labourers and school children to determine actual consumption and the contribution of cowpea and possibly, other legumes to the nutrition of each group.

3. Intensified work on recipe development using cowpeas.

APPENDIX I

DESCRIPTIONS OF VARIETIES OF COWPEAS USED IN THE SURVEY

The different types of cowpeas used for the preference study have been coded as LV (Local Variety) and numbered from 01 to 13.

All the types except three have names that are only descriptive and cannot be regarded as local names. Below are descriptions of the types that were used for the study and where applicable the Ewe names are given in brackets.

Code No.	Colour	Grain Size	Eye Type
LV01 (Vakli)	A mixture of dark brown and mottled light brown	Medium	Small white
LV02 (Gbovena)	A mixed grain of dark and pale brown	Medium	Small white
LV03	Bright Maroon red. This type is said to give blood. Most popular in Ashanti	Small	Small white
LV04 (Gbodo)	Dull maroon red	Slightly flat shaped Medium	Tiny white
LV05	Pinkish red	Large	Small white
LV06	Very dark purplish dull brown	Medium	Small white

Appendix I continued

Code No.	Colour	Grain Size	Eye Type
LV07	Dark grey purplish	Small	Small white
LV08	Brown mottled. A new variety being experimented in Ohawu Agricultural Centre	Medium	Small
LV09	Light cream	Large flatish	Large black
LV10	Mixed dark and light brown	Small	Tiny white
LV11	Mixed spotted dark and light brown	Medium	Tiny white
LV12	Attractive light brown. This type is nicknamed Keta special	Slightly flatish. Medium	Small brown
LV13	Mixed light brown and maroon red	Medium	Small dark and white

APPENDIX 2

CHEMICAL COMPOSITION OF THE COWPEA TYPES*

Local Variety	MOISTURE %			ASH %			% PROTEIN NITROGEN			% PROTEIN			
	A	B	Ave.	A	B	Ave.	A	B	Ave.	A	B	Ave.	Dry Weight of Ave.
LV01	15.7	16.2	15.9	2.3	3.2	2.8	3.6	3.7	3.6	22.3	23.9	22.6	26.9
LV02	12.0	11.5	11.8	3.6	4.4	4.0	3.4	3.5	3.4	21.0	21.9	21.4	24.3
LV03	11.6	8.8	10.2	3.1	3.2	3.2	3.6	3.6	3.6	22.3	22.2	22.3	25.2
LV04	13.3	12.5	12.9	3.8	4.3	4.0	3.9	3.7	3.8	24.6	23.2	23.9	27.5
LV05	11.8	12.3	12.0	3.6	3.5	3.5	3.6	3.6	3.6	22.3	22.6	22.5	25.5
LV06	17.7	17.4	17.5	3.3	4.8	4.0	3.8	3.9	3.9	23.5	24.7	24.1	29.2
LV07	15.7	15.7	15.7	2.7	2.8	2.8	3.6	3.5	3.6	22.3	22.1	22.2	26.3
LV08	13.4	13.8	13.6	2.6	2.6	2.6	3.1	3.0	3.1	19.3	19.0	19.2	21.6
LV09	13.4	12.8	13.1	3.1	3.7	3.4	3.5	3.5	3.5	21.7	22.1	22.0	25.4
LV10	12.8	12.6	12.7	3.2	3.2	3.2	3.8	3.8	3.8	23.9	23.8	23.8	27.3
LV11	12.7	11.7	12.2	2.6	2.6	2.6	3.5	3.5	3.5	21.6	21.6	21.6	24.7
LV12	13.5	13.5	13.5	3.1	3.0	3.0	3.5	3.6	3.5	21.9	22.2	22.1	25.5
LV13	12.6	12.8	12.7	3.1	3.1	3.1	3.4	3.5	3.5	21.4	22.1	21.8	25.0

* Analysis done at the Food Research Institute

APPENDIX 3

SOME DIETARY USES OF COWPEAS IN GHANA

	Name of Dish	Description
1.	Bobo (Ewe) Yoke Gari (Ga)	Simply, the grains are boiled and served with fried onions, tomato and pepper sauce or with Dzomi* and gari*. This dish is a popular vendor food which is eaten largely by school children and workers. It is very filling and wards off hunger for many hours.
2.	Ayikple (Ewe)	Boiled cowpeas are combined with roasted corn meal and mashed to make a fairly stiff porridge which is served with sauce. Also very satisfying.
3.	Workye (Hausa) (Rice & Beans)	Cowpea is cooked combined with rice and served with sauce.
4.	Bean Stew	Cooked cowpea is used for a stew and served with staples but popularly with fried plantain. A favourite dish especially among students.
5.	Cowpea Soup	a) Fresh tender cowpea is boiled, mashed and used as thickening for light soup. Usually served with fufu. The dry grains are boiled and added to soups and stews. b) The leaves of the cowpea are used for green vegetable stew.
6.	Ayibli (Ewe)	Cowpea is cooked combined with maize (corn) and served with roasted groundnut or dry coconut for snack.

7.	Akla (Ewe) Koose (Hausa)	Cowpea is processed by dehusking and ground into paste. The paste is whipped, seasoned and fried in balls. A popular snack food which is served with the stapples such as akatsa*, agidi or kafa*, gari* or yakayake.*
8.	Cowpea meal	The dehusked grains are thoroughly dried and ground into flour and kept for use in making Akla.
9.	Olele or Moimoi or Tubani	The cowpea paste is blended with water seasoned and steamed or baked. It is served as a side dish to other staples. It is enriched by adding shrimps or eggs. Cowpea meal may be used.
10.	Tukuru (Hausa)	Cowpea flour after moistening and seasoning is formed into balls and boiled as dumplings. A popular dish in Northern Ghana, which is served with fried pepper and onion, or simply with ground dry pepper.
11.	Adayi	Dehusked cowpea grains are boiled and mashed into paste. It is served plain or with a dash of Dzomi*. It is a favourite snack food and one suitable for infants with an addition of milk or eggs.

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* See Appendix 4.

APPENDIX 4

DESCRIPTION OF OTHER DISHES MENTIONED IN THE TEXT

Name of Dish	Description
Agidi (Ga) Kafa (Hausa)	Semi solid maize porridge wrapped in green leaves.
Akatsa (Ewe)	Liquid maize porridge usually served for breakfast.
Dzomi (Ewe)	Grade A and sweet scented palm oil.
Fufu	Boiled pieces of yam or cassava or plantain pounded into a sticky mass.
Gari	Gelatinized grains of grated cassava.
Yakavake (Ewe)	Steamed cassava dough.
Kelewele (Ga)	Cubed or sliced pieces of plantain seasoned and fried.
Kaklo	Pounded ripe plantain mixed with corn dough seasoned, and fried.
Kokonte	Cassava flour.
Kenkey (Ga)	Steamed fermented dough.

APPENDIX 5

INNOVATIONS FOR COWPEA USE

Presented here are some new ideas for the use of Cowpeas.

Name of Dish	Description
Cowpea balls or cutlets	Cook cowpea (preferably the brown type). Mash and season with ground onion, tomato and salt. Form into balls or cutlets. Dip in beaten egg and coat with bread crumbs, and fry. Cover with sauce and serve with boiled rice. The balls or cutlets can be served as a first course meal.
Ayi Yakayake (Cowpea crumbles)	Make cowpea flour into paste. Add ground onion, salt and some cooking oil. Steam till cooked. Mash into crumbs and mix with sauce. Can be served with the sauce separately.
Aviwo kple (Cowpea flour porridge)	Cowpea lightly roasted and ground into a meal. Use the meal to make a thick porridge. Add some cooking oil if desired and serve with meat or fried fish sauce.
Cowpea Soup	a) Make "first course" light soup adding dehusked cowpea grains. b) Use cowpea flour as thickening to light soup. c) Mash dehusked cowpea grains and use as thickening to light soup.

Cowpea flour cake	Try cowpea flour as part supplement to wheat flour for cake. It is nourishing and delicious.
Cowpea pie	Boiled mashed cowpea to which fried onion and tomatoes are added, may be used as pie filling. Serve at a buffet.

APPENDIX 6A

PROTEIN VALUES (NDp Cals %) OF MIXTURES OF LEGUMES* AND OTHER FOODS. THE MIXTURES PROVIDE 1100 CALORIES

		Cassava Flour	Rice	Sorghum	Wheat	Maize	% Maize/ Cassava
		NDp Cals %					
Staples alone		1	4.9	4.6	5.7	4.8	3.4
Food substituted for proportion of staple	Quantities substituted (g)						
Legumes in general	30	1.9	6.7	6.6	8.3	6.5	4.5
"	45	2.3	6.5	6.8	8.3	6.6	4.8
Soybean	30	3.9	7.4	7.4	9.0	7.1	5.8
"	45	4.9	8.0	8.0	9.5	8.0	6.5
Groundnut	30	1.8	5.9	5.6	6.5	5.9	4.4
"	45	2.2	6.2	6.0	7.0	6.1	4.4
Groundnut flour	30	3.1	7.1	7.0	7.9	7.0	5.4
Skim milk powder	15	2.5	7.1	7.8	8.0	7.0	5.2
"	30	4.1	7.0	7.9	9.4	7.5	6.1
"	45	5.7	8.7	8.5	9.9	8.5	7.1
Fish meal	15	3.7	7.7	7.5	9.2	7.4	5.8
"	30	5.9	8.8	8.8	10.1	8.7	7.3
Legumes in general Skim milk powder	30 15	3.5	7.4	7.3	8.9	7.2	6.0
Legumes in general Fish meal		4.4	7.8	7.9	9.2	7.7	6.2
Egg	45	30	7.2	6.8	7.4	6.8	6.1
Low fat groundnut flour Low fat sesame flour		4.1	7.2	6.8	7.4	7.0	6.2

*Taken from "Protein Requirements, F.A.O. Publication 1965

APPENDIX 6B

PROTEIN VALUES (NDp Cals %) OF MIXTURES OF LEGUMES* AND OTHER FOODS. THE MIXTURES PROVIDE 2,200 CALORIES

		Cassava Flour	Rice	Sorghum	Wheat	Maize	% Maize/ Cassava
		NDp Cals %					
Staples alone		1	4.9	4.6	5.7	4.8	3.4
Food substituted for proportion of staple	Quantities substituted (g)						
Legumes in general	30	1.5	6.2	6.1	7.0	6.3	4.2
" "	60	1.9	6.7	6.6	8.3	6.5	4.5
" "	90	2.3	6.5	6.8	8.3	6.6	4.8
Soybean	30	2.1	6.5	6.7	7.2	6.7	5.0
"	60	3.9	7.4	7.4	9.0	7.1	5.8
"	90	4.9	8.0	8.0	9.5	8.0	6.5
Groundnut	30	1.4	5.5	5.1	6.2	5.1	4.2
"	60	1.8	5.9	5.6	6.5	5.9	4.4
"	90	2.2	6.2	6.0	7.0	6.1	4.4
Low fat groundnut flour	60	3.1	7.1	7.0	7.9	7.0	5.4
Low fat groundnut flour Low fat sesame flour	30) 30)	41	7.2	6.8	7.4	7.0	6.2
Fish meal Legumes	15) 45)	3.0	7.0	7.1	9.0	7.0	5.4
Legumes in general Skim milk powder	45) 15)	2.2	6.8	7.0	8.8	6.9	4.8
Soybean Skim milk powder	45) 15)	4.0	7.5	7.7	9.2	7.4	5.7

* Taken from "Protein Requirements, F.A.O. Publication 1965

FOOD RESEARCH INSTITUTE
(C.S.I.R.)

CONSUMER PREFERENCES FOR COWPEA TYPES

Town .....Region.....Date.....

INFORMATION ON RESPONDENT

1. Male.....Female.....Ethnic Group.....
2. Educated? Yes.....No.....
3. If Yes, level of Education
   Elementary.....Secondary/Teacher Training.....
   Vocational/Technical..... University.....
4. Married? Yes ( ) No ( )
5. Occupation .....
6. Age Group:
   Below 20 years ( ) 30-40 years ( )
   20 - 30 years ( ) 50-60 years ( )
   40 - 50 years ( )
7. No. of children staying with respondent.....
   (Including her own)
8. Their age range and number in each age group:
   Under 5 years ..... 13-15 years .....
   6 - 12 years ..... Over 16 years .....

COWPEA CONSUMPTION

9. Do you eat cowpeas? Yes..... No.....
10. If No, what is the reason.....
    a) It is a taboo .....d) makes me sick .....
    b) Produces gas .....e) has too much weevils.....
    c) Don't like it.....f) have never eaten it.....
    Others.....
    .....

11. If Yes, how often do you eat a cowpea dish?

    Everyday ( ) Once a week ( )

    Twice a week ( ) Occasionally ( )

12. Cowpea dishes are said to produce gas and cause indigestion.
    Do you experience this? Yes..... No.....

13. Does this prevent you from eating it as much as you wish?

    Yes ..... No.....

14. Which cowpea dish do you eat a lot?.....

15. For which meals do you usually have cowpea dishes?

    Morning meal (breakfast) - Any reasons

    Noon meal (lunch) -

    Evening meal (dinner) -

    Snacks -

16. Is there any reason why you like cowpea dishes?

    Yes ..... No.....

    If yes, what is the reason

    a) Satisfying..... e) Very tasty .....

    b) Vegetarian..... f) Nutritionally good .....

    c) No reason..... Others .....

    d) Cost less to prepare

17. Is there any particular day on which you eat cowpea dish?

    Yes..... No.....

    If yes, which day

    Monday ..... Friday .....

    Tuesday ..... Saturday.....

    Wednesday ..... Sunday .....

    Thursday .....

18. Rank your preference for the cowpea dishes that you eat.

1st ..... 4th .....

2nd ..... 5th .....

3rd .....

19. Score the following cowpea dishes according to frequency of use as below:

Everyday	-	8	Occasionally	-	2
Once a week	-	6	Never eaten	-	1
Twice a week	-	4	Not known	-	0

Frequency of use

1. Bobo or Yoke gari .....
2. Akla or Koose .....
3. Ayikple (cowpea porridge) .....
4. Olele or Moimoi or Tubani .....
5. Bean stew .....
6. Ayibli (cooked cowpea & corn) .....
7. Adayi (boiled cowpea grits) .....
8. Workye (Rice and Beans) .....
9. Gbakusi (roasted cowpea flour porridge) .....
10. Tukuru (cowpea & Baobab) leaves ground together .....

Others .....

20. Which of the above cowpea dishes do you prepare at home and which do you buy?

Those often bought	Those prepared at home

21. Reasons for not making dish at home:

a) Too difficult to make at home

b) Do not know how to make it

c) Cannot make it as good as one sold.

22. Which of these varieties of cowpea do you like for a particular dish. Refer to dishes listed in Q.18 above. (Show cowpea samples to respondents).

Code No.	Name of Dish	Reasons

Possible Reasons

a) Gives nice colour
b) Traditionally used
c) Is more tasty
d) Binds well
e) Grinds easily
f) Peels faster
g) Gives good texture
h) Cooks quickly
i) Contains less weevils
j) Doubles in quantity.

PREFERENCE FOR COWPEA TYPES

23. Rank these cowpeas according to preference, giving reasons (show samples).

Code No.	Reasons (listed below)
1st	
2nd	
3rd	
4th	
5th	

Reasons

a) Like the colour
b) Tastes good
c) Has good texture
d) Said to be nutritionally better
e) Doubles in quantity
f) Cooks faster
g) Contains less weevils
h) Costs less
i) Good for a particular dish (Name dish)
j) Grinds easily
k) Binds well
l) Peels easily for processing.

24. What characteristics do you Not like about any of the varieties you know?

Code No.	Characteristics

Characteristics

a) Takes too long to cook
b) Does not bind well
c) Too much black eyes
d) Colour not appealing
e) Does not taste good
f) Contains too many weevils

Others (specify).....

.....

25. Tick any of these cowpea types that you are not familiar with.

LV01	( )	LV06	( )
LV02	( )	LV07	( )
LV03	( )	LV08	( )
LV04	( )	LV09	( )
LV05	( )	LV10	( )

Others .....

26. Which of these varieties do you see in the market but have never bought?

Code No.	Why

27. Rank these varieties in order of preference according to:

Order of Preference	Colour	Taste	Quick Cooking	Increase Capacity
1st				
2nd				
3rd				
4th				
5th				

Insert code numbers under each column.

PROCESSING

COWPEA FLOUR

28. Do you use cowpea flour? Yes ( ) No.( )

29. If yes, for which dish or dishes.....

30. Do you make the flour yourself?

31. If yes, how do you make it?

a) Soak the cowpea, remove husk, dry and grind in a mill ( )

b) Pound cowpea, blow off husk and grind in a mill ( )

c) Grind cowpea whole and sieve ( )

d) Grind cowpea whole, do not sieve ( )

e) Pound cowpea, blow off, soak to remove skin, dry and grind. ( )

32. If No, why do you not make cowpea flour?

1. Too difficult to make ( )
2. Does not use it ( )
3. Does not like products made with cowpea flour ( )
4. Does not bind well ( )

Others .....

33. Would you like to have cowpea flour in the market or shop to buy?

Yes ( ) No ( )

34. What equipment do you use in making cowpea flour?

a) Commercial mill..... c) Mortar.....

b) Grinding stone..... Others.....

35. Which of these cowpeas do you use in making the flour and why?
(Write the code numbers and give the reasons).

.....

.....

.....

Cowpea Paste

36. Do you make cowpea paste for any dish?

Yes ( ) No ( )

Which dish or dishes? .....

.....

37. How do you make the paste?

a) Soak cowpea, remove the husk with the hand and grind in a mill ( ).

b) Soak cowpea, whole and grind ( )

c) Pound cowpea in a mortar, winnow, soak and grind ( ).

38. What method do you use in removing the husk from the cowpea?

a) Soak and rub with fingers ( )

b) Pound and blow off the husk ( )

c) Pound, blow off the husk, soak and peel ( )

Others .....

.....

39. Which of these varieties do you find easy to dehusk? (Write code numbers)

.....

.....

40. Which variety do you find particularly difficult to dehusk? (Write code numbers).

.....

.....

41. What equipment do you use for grinding cowpea paste?

1. Grinding stone ( ) 2. A mill ( )
3. A blender or liquidizer ( )

42. Do you like Akla (Koose)? Yes ( ) No ( )

43. Which type do you like?

Dry ( ) i.e. using cowpea flour
Moist ( ) i.e. using cowpea paste
Both ( )

CEREMONIAL USES

44. Are cowpeas used for special ceremonies?
If yes, what ceremonies?

Sacrifice	( )	Fasting	( )
Festival	( )	Announcement of death	( )
Christening	( )	Twin ceremony	( )

Others (specify) .....

.....

45. Are special cowpeas used for these ceremonies?

Yes ( ) No ( )

46. If yes, which types are used? Indicate by code numbers.

Code No.	Ceremony

47. What dishes are prepared for these ceremonies?

Ceremony	Dish

48. How much cowpea do you buy at a time?
Cigarette tins .....
Kojo Abaka or Ameta gba .....
"American" tin .....
Kerosine tin .....
Half a bag .....
One bag .....

49. How do you store cowpeas at home?

a) In a bowl ( ) g) In boxes ( )
b) In an enamel bowl ( ) h) In jute bag ( )
c) In clay pot ( ) i) In glass jars ( )
d) In plastic bowl ( ) j) Hang over smoke ( )
e) In calabash (Akpaku) ( ) k) In a pot of mud ( )
f) In their pods ( ) l) In a tin ( )

Others (specify) .....

.....

50. What storage problem do you encounter in the home?

Weevil infestation ( )

Germination ( )

Staleness or dampness( )

51. For how long can you store cowpeas at home?.....

52. What determines the quantity of cowpea you purchase and frequency of use?

a) When fresh in season ( )

b) Low cost ( )

c) Both ( )

d) Available storage facilities ( )

53. What prevents your purchase of cowpea in large quantities?

a) Weevil infestation ( )

b) No storage facilities ( )

c) Eaten only occasionally ( )

Others .....

54. If you make cowpea flour, in what container do you store it?

Enamel bowl ( )

Clay pot ( )

Kerosene tin ( )

Polythene bags ( )

Glass bowl ( )

Calabash ( )

Plastic bowl ( )

Made only in a small quantity for immediate use ( )

Other containers (specify) .....

.....

55. Does your container have a lid? Yes ( ) No ( )

56. Is the lid tight fitting? Yes ( ) No ( )

57. Do you make cowpea flour because the beans have become weeviled?

Yes ( ) No ( )

58. If no, why do you make cowpea flour?

a) Like it for some special dishes (name dishes)

.....

b) Keeps much longer than the grains ( )

c) Uses it often ( )

d) It is convenient to use ( )

e) Increases in volume ( )

Others .....

59. For how long can you keep cowpea flour at home?.....

60. What are your observations on cowpea flour that has been kept for too long?

a) Loses its binding quality ( )

b) Tastes different ( )

c) Becomes rancid ( )

d) Becomes weeviled ( )

e) Becomes caky ( )

Others .....

RECIPES

61. New cowpea dishes other than those listed in No.18

Name of Dish	Preparation

62. Make a list of equipment and gadgets used in the preparation of cowpea dishes.

.....

.....

.....

.....

Name of Interviewer : .....

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