

**DETERMINANTS OF IODATED SALT
CONSUMPTION IN HOUSEHOLDS IN THE
KINTAMPO SUB-DISTRICT**

BY

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DECLARATION

I, Hannah Adjei, hereby declare that this submission is my own work. To the best of my knowledge, this submission contains materials neither previously published nor written by another person and which to a substantial extent, has been accepted for award of any degree or diploma of a university or other institution of learning except where acknowledgement has been made in the text

A handwritten signature in black ink, appearing to read 'H. Adjei', is positioned above the printed word 'Signature'.

Signature

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CERTIFICATION

The under-mentioned persons supervised the conduct of this study from proposal development stage, data collection and, the write up and its submission.

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Signature.....

Name: Dr. W.B. Owusu

Signature.....

Name: Professor Lawrence Osei

DEDICATION

I dedicate this study to the Almighty who has always supported my family and myself particularly in times of difficulty.

Acknowledgement

I wish to thank all the lecturers at the School of Public Health for sharing their knowledge and experience with us, the 2001-2002 year group. My sincere thanks go to the non-teaching staff of the school as well for their immense contribution in making our study as smooth as was possible. I wish also to thank the staff of the Kintampo District Health Administration, particularly, Dr, Adjase for the immense assistance given to me during the period of this study. My sincerest appreciation goes to the staff of the Kintampo Health Research Center, particularly to Messes Seeba and Charles Zandoh for their unqualified assistance in sample selection and data analysis. I wish also to acknowledge the contributions of the staff and students of the Rural Health Training School and the District hospital staff all at Kintampo. Finally I wish to thank my family for their untiring support. God bless you all.

LIST OF ABBREVIATIONS

DA	- District Assembly
DHA	District Health Administration
DHMT	- District Health management Team
g	- Gram
GDHS	- Ghana Demographic and Health Survey
GES	Ghana Education Services
ICCIDD	- International Council for the Control of Iodine Deficiency Disorders
IDD	- Iodine Deficiency Disorders
IEC	Information Education Communication
IQ	- Intelligence Quotient
JSS	Junior Secondary School
KI0 ₃	Potassium Iodate
KABP	- Knowledge, Attitude, Beliefs and Practices
Kg	Kilogram
Mcgli	Micrograms Per Litre
MOE	Ministry of Education
MOH	Ministry of Health
NSIC	- National Salt Iodation Committee
PPM	- Part Per Million
SSS	Senior Secondary School
T3	Tri-iodothyrosine
T4	Thyroxine
TSH	- Thyroid-Stimulating Hormone
UNICEF	- United Nations Children's Fund
USA	- United States of America
USI	- Universal Salt Iodation
WHA	- World Health Assembly
WHO	World Health Organization

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MAP OF GHANA



Abstract

About 1.6 billion people in the world are known to be at risk of developing Iodine Deficiency Disorder, IDD (WHO, 1994). Ghana has a fair share of this public health menace. A study conducted in 1995 in 30 districts indicated that 33 percent of the districts had severe IDD levels requiring immediate attention (Asibey-Berko et al, 1994). Universal Salt Iodation, backed by legislation, (the Food and Amendment Act 523) was adopted as the strategy, with a target of achieving total elimination of IDD by the year 2001 (Agble et al, 1999). One of the key indicators used is that, at least, 90 percent of households should be consuming adequately iodized salt. The process for achieving this goal has been rather slow and arduous considering the fact that Ghana is a net exporter of iodated salt. Small scale producers who have not been adequately integrated into the programme, continue to smuggle cheaper un-iodated salt onto the market.

Basically, districts, like the Kintampo, District, are responsible for the promotion of iodated salt to protect their populations from IDD. An Iodated salt promotion programme has been on going in the district since 1995. A quick assessment in 1998 found a low consumption level of 8.1 percent in the district. Since then, education has been intensified.

This cross-sectional study was carried out to re-assess consumption levels and to examine the determinants of household iodated salt consumption in the Kintampo sub-District. A sample of 148 persons aged at least 15 years, who normally cooked household meals were interviewed using structured questionnaires. Samples of salt from the selected households were tested for iodine using test kits. Additionally, a

census of salt traders and interviews were carried out to obtain information on availability of iodated salt.

The study revealed that, the level of awareness was high (80%), but knowledge on goitre was very low (20%). Prevalence has increased substantially from 8.1 percent in 1998 to 67 percent in 2002. Consumption in Kintampo (70.7%) was higher than in rural areas (62.1%) and about 54 percent of households using iodated salt were not aware because of re-bagging.

Factors that enhanced consumption of iodated salt at the household level included, male heading of household, smallness of household, knowledge on goitre and benefits of iodated salt. Other factors included formal educational attainment above primary level (at least 6 years of schooling), urban residence, availability of iodated salt and the ability to afford iodated salt. Mass media was found to be the most effective media (80.3%) for promoting iodated salt.

Bulk packaging (25kg and 50 kg) and subsequent re-bagging into small portions by retailers as well as pre-packaging of 250 gram weight sachets appears to be making iodated salt more available and affordable.

1. CHAPTER ONE

1.0 INTRODUCTION

An estimated 1.6 billion people in 118 countries live in areas where the soils are iodine deficient. Food cultivated on such soils lack iodine. Therefore populations living in these areas are at risk of developing Iodine Deficiency Disorders (IDD), (WHO, 1994). The importance of iodine as an essential element arises from the fact that it is a constituent of the thyroid hormones thyroxine (T₄) and tri-iodothyronine (T₃). These hormones along with others are essential for normal physical and mental development (Hetzel et al, 1994). Iodine deficiency does not only cause goitre but also result in spontaneous abortions, still births, irreversible brain damage in the foetus and infant. It also retards psychomotor development in children. Iodine deficiency impedes children's learning ability and is the most common cause of preventable mental retardation. (WHO, 1993). The impact of iodine deficiency on intellectual development and the resulting brake on socio-economic development has been the main reason for massive resource mobilisation the world over to deal effectively with IDD.

Taking just a teaspoonful of iodine over a whole lifetime provides a solution to this devastating and worldwide problem. Food fortification, particularly salt iodation, has proved to be highly successful and a sustainable means of achieving this supply of iodine. Universal Salt Iodation (USI) is therefore, the most preferred strategy in the fight against IDD worldwide (WHO, 1991). Goitre has been recognised as a public health concern particularly in the northern sector of Ghana five decades ago. A small survey in the early 90's in the Upper East Region of Ghana found the prevalence of goitre to be 59 percent in Sekoh and 77 percent in Builsa. The realisation to address the IDD situation in the country was heightened after two world fora. The

first forum was the 43rd World Health Assembly (WHA) in May 1990, which adopted a resolution calling for the elimination of IDD as a public health problem by the year 2000. The second forum was the World Summit for children at the United Nation in New York in September 1990. Ghana became the first signatory to the convention of the Children's Right Bill, pledging to support all activities to eliminate IDD by 2000.

A nation-wide survey in 30 districts to assess the magnitude and distribution of IDD in the country indicated that 33% of districts surveyed had a level of IDD requiring immediate intervention. The remaining 67 percent had mild to moderate conditions, which could wait for more permanent intervention. Total goitre rate was found to be around 10 percent. (Asibey-Berko et al, 1995). Through UNICEF assistance and the co-ordinating role of the National Salt Iodation committee (NSIC), the production of iodated salt commenced in 1995. By 1997, as many as 17 large to medium scale salt producers and salt processors had been supported to start producing iodated salt. To give legal backing to the programme, the Food and Drugs Amendment Act 523 was passed in December 1996 and became effective in July 1997. The Act requires that any salt meant for human and animal consumption should be iodated (Agble et al, 1999).

In order to fulfil international commitments, the Ministry of Health (MOH), the lead agency representing the government, targeted the consumption of iodated salt as a priority health intervention. Information, education and communication (IEC) activities through the mass media (radio and television), group talks, counselling at health facilities and at the community level are being implemented. Guidelines for monitoring the availability and quality of iodated salt in markets and communities have also been designed for all stakeholders (UNICEF/MOH, 1997). Personnel from relevant agencies have been trained and the scheme is being implemented.

(Agble et al, 1999). A programme to initiate and promote the consumption of iodated salt throughout the country has been in operation since 1995. The MOH set a target that, by the year 2001, at least 90 percent of all households in the country should be consuming iodated salt only.

1.1. Statement of the Problem

In line with MOH policy of decentralization, the District Health Management Teams (DHMT) of the 110 districts are basically responsible for promoting the consumption of iodated salt in their respective districts with support from the national office. The DHMT of Kintampo District of the Brong Ahafo region like other districts has on-going IEC activities to promote the consumption of iodated salt since the inception of the programme. A quick assessment in 1998 indicated that consumption of iodated salt in households in the district was very low (8.1%). Other findings of the assessment indicated that there was low level of awareness on iodated salt, and complaints from consumers about unavailability and high cost of iodated salt in the district as a whole. Measures were put in place to step up education on iodated salt in the district. This study therefore sought to assess the impact made so far and to identify potential determinants of household consumption of iodated salt.

1.2.0. Objectives

1.2.1. The Main Objective

The primary objective of the study was to determine the factors that influence consumption of iodated salt in households.

1.2.2. Specific Objectives were:

- To determine the level of consumption of Iodated salt in households
- To assess the effects of demographic, socio-economic and other factors on the consumption of iodated salt in households.

CHAPTER 2

2.0 Literature Review

In 1990 the 43rd World Health Assembly (WHA) of WHO adopted the goal to eliminate IDD as a public health problem by the year 2000. This confidence was as a result of the elimination of IDD in a number of developed countries many years ago through the simple, cost effective process of salt iodation and consumption. These countries include the United States of America (USA), United Kingdom (UK), Switzerland, Australia and many others (Hetzel et al., 1996).

Programmes to eliminate IDD in Africa started only in the 1980's and great strides have been made in this endeavour though some challenges still remain to be overcome. Sustained advocacy, resource mobilization, monitoring and evaluation are required to achieve the ultimate goal. (Kavishe, 1997). The 52nd WHA urged member countries to monitor the iodine status of their population and the quality of iodised salt in all areas including the goal of sustainable elimination of IDD as a public health problem (WHA, 1999).

Conclusions from various studies have reiterated the need for sustained governmental, industrial and popular support for programmes to eliminate IDD even after it has been controlled, to prevent complacency. (Zhou et al., 1997).

2.1. Criteria for Sustainable Elimination of IDD

To declare a sustainable elimination of Iodine Deficiency Disorders as a public health problem, some criteria should be met. These include:

- Normal iodine nutrition in population, confirmed by the urinary iodine concentration with a median value equal or above 100 microgram/litre (100 mcg/l)
- Recent monitoring data that have been collected within the past two years.

If iodised salt is the vehicle for fortification, as in almost all countries, there must be guaranteed availability and consumption of adequately iodised salt. This must be demonstrated by proof that, at least 90 percent of households are consuming iodated salt.

Local production and or importation of iodised salt must be in quantities sufficient to satisfy the potential human demand of about 4-5 kg/person/year and 95 percent of salt for human consumption must be iodised at the production or imported level according to government standards for iodine content. Lastly the percentage of food grade salt with iodine content of at least 15ppm in a representative sample of households must be at least 90 percent.

Estimation of iodine at the production and or import level and retail/ consumer levels must be made by the titration method, while at household levels, it could be made by either titration or certified kits.

Evidence of sustainability must be based on the following:

- Effective functional councils or committees at various levels, who will be responsible to the government for the management and monitoring of national programme for the elimination of IDD. The committees should be multi-disciplinary, involving all stakeholders with the MOH as the lead organization.
- Evidence of political commitment
- Commitment to assessment and re-assessment of progress in the elimination of IDD with access to laboratories able to provide data on salt and urine iodine.
- A programme of public education and social mobilization on the importance of IDD and the consumption of iodated salt.
- International verification of the elimination of IDD. (IDD Newsletter 1999).

2.2. Factors associated with consumption of iodated salt.

2.2.1. Coverage Level

Available data in 1999 indicated that African countries have achieved varying degrees of progress in their effort to control IDD. This conclusion was based on coverage data from rapid assessment using test kits to test salt in households. The Republic of Benin, Burkina Faso and Togo had achieved coverages of 90 percent, 23 percent and 71 percent respectively. The Ghana Demographic and Health Survey (GDHS) of 1998 reported a national coverage of 16 percent. The most recent nation-wide assessment also reported the national coverage in Ghana as 22.1 percent (Agble et al, 1999). Results of a quick assessment of coverage in 1998 in the Kintampo district indicated coverage level of 8.1 percent (Kintampo District, 1998). The results of these studies indicate that Ghana has a long way to go in achieving the global goal of eliminating IDD.

2.2.2. Demographic and Socio-Economic Factors

The assessment study by Agble et al, (1999), noted that there was not much difference between male and female respondents as far as knowledge on IDD and iodated salt was concerned. Urban residents tended to consume more iodated salt than those in the rural areas. There is no information on household size and age of respondents in relation to the consumption of iodated salt.

2.2.3. Level of Knowledge

One indicator of an effective IDD control is a programme of social mobilisation and public education on the importance of iodine and the consumption of iodated salt. The objective of the

education programme is to educate the general public on IDD and the benefits of iodated salt, remove misconceptions about IDD, and to promote behaviour change in order to raise iodine status in the population. The effectiveness of the education programme depends on the methods used, skills of staff and resources available to the district. Even after attaining sufficient levels of iodised salt consumption, education must continue. Recent nutrition surveys in the USA show small but steady erosion in American iodine intake. There has been calls to step up continuous education (Salt Institute, 2002).

A KABP study in Ghana reported that 66 percent of respondents did not know the cause of goitre (Asibey Berko et al, 1995). Lack of information, poor attitude towards acceptance of iodised salt and misconceptions about iodated salt were cited as important obstacles preventing the use of iodated salt (Agble et al., 1999). The fact that people have knowledge about iodated salt does not always mean that they will use it. It has been shown that consumption depends on availability as well as cost..

2.2.4. Availability

In the assessment study conducted in Ghana (Agble et al., 1999), the major reason for non use of iodated salt was that it was not available (52.3%), implying that availability has a positive correlation with consumption. Competitive pricing can also affect availability; when cost is competitive, demand may increase and consequently traders may be encouraged to bring in more from the source. Availability and competitive pricing, however, may not guarantee consumption if households are not adequately informed about iodated salt.

2.2.5. Cost of Iodated Salt.

In order to eliminate IDD permanently, iodation of salt and its distribution should become an integral part of a salt production and distribution system that can be managed on a sustainable basis after an initial period of support and monitoring by government and the donor community.. The cost of iodisation is known to be extremely low – only about US\$0.05 per person per year (WHO, 2001), compared to packaging and transportation. These costs might be absorbed by consumers or through more efficient and competitive purchasing. (Venkatesh et al., 1995). In the US, salt producers co-operated with public health authorities and made the cost of both iodised and plain salt to consumers the same. The mass media urged the population to use iodised salt for the prevention of IDD. The availability of cheaper non-iodised salt is perhaps the most persistent problem for IDD

Control programmes in developing countries, including Ghana, demands effective and durable solutions. (Venkatesh et al., 1995). The second reason for non-use of iodated salt was because it was expensive, (Agble et al., 1999). The Food and Drugs Board had, however, approved bulk packaging of 25 and 50 kilogram weight of iodated salt in 1998 to enable traders re-bag into quantities which consumers can afford (Agble et al., 1999).

2.2.6. Iodine Loss

1. Experience has shown that all the iodine can be lost from the sack if certain precautions are not taken. A study was done to assess the effect of humidity and packaging materials on iodine stability in typical salt samples from twelve countries with tropical and subtropical climates, including Ghana, under controlled conditions. The results indicated that iodine was rapidly lost in most unrefined salt samples. The presence of moisture, due

to hygroscopic impurities and metal ion impurities such as iron accelerated the loss of iodine. Packaging in a moisture-proof continuous film package significantly increased the iodine retention in all samples (Diosady et al., 1998). The study also found that in most developing countries, salt was sold packaged in small portions or in bulk. Packaging materials included paper, high and low density polyethylene and woven jute or straw bags (Diosady et al., 1998).

2.2.7. Aesthetic Characteristics

Characteristics such as size of granules, colour and taste affect the choice of salt. In the coverage assessment by MOH in 1999, four types of salt were identified, namely coarse, granular, fine and rock salt. The findings indicated that coarse salt was the most common household salt used in the country followed by granular, fine and rock salt. The reason for the choices are that people are used to the unrefined characteristics (size of granules, colour, and taste) of non-iodated salt. There is a belief also that iodised salt “spoils soups”. This is probably because iodated salt is refined and concentrated. The persistence of such beliefs is an indication that education attempts have not been very effective. Ranganathan, in 1999, found that coarse salt iodised with iodate at normal room temperature and moderate humidity showed iodine loss of 20 percent after 12 months. Some food manufacturers do not use iodated salt for fear that it will interfere with the colour of their products and affect consumer acceptance (Salt Institute, 2002).

2.2.8. Hypothesis

For this study it was hypothesised that:

- The level of use of iodated salt was the same for urban and rural respondents.

- Consumption levels were the same for households, which could get iodated salt to buy, and those that could not.
- There was no difference in the levels of consumption of iodated salt between those who could afford and those who could not afford iodated salt.

CHAPTER 3

3.0. Materials and Methods

3.1 Type of Study

A cross-sectional approach was used for the study and two study units were considered,

- i). One person aged 15 years and above (who normally cooked the household's meals), and
- ii). All Salt traders in the communities where the selected houses were located.

3.2 Study Variables

The dependent variable of the study was the proportion of households using iodated salt.

Independent variables comprised demographic and socio-economic factors, level of knowledge, perceived benefits, availability and affordability of iodated salt and source of information

3.3 Study Area

The Kintampo district is one of the 13 districts of Brong Ahafo Region. The Kintampo sub-district, one of the 8 sub-districts of the district, has an estimated population of 38,542 constituting about a quarter of the total population of the district as at mid-year 2002. It is the most populated sub-district. Vegetation is of transitional zone with two rainy seasons in a year. The major rainy season is between April and July whilst the minor one spans from September to October. The district capital, (Kintampo) is known to be located exactly at the centre of Ghana. It is the only sub-district with some semblance of urban settlement. The indigenous people are the Bonos and the Mos but there are other ethnic groups from the rest of Ghana, particularly from the northern part of the country.

The sub-district has a hospital, a private clinic and 2 private maternity homes. There are 6 kindergartens, 16 primary schools, 4 Junior Secondary Schools (JSS), and one Senior Secondary School (SSS). Apart from these, there is a Rural Health Training School and a well-established Health Research Centre. The main occupation of the inhabitants are farming and trading. Kintampo is a very busy and important food market centre. A first class road connecting the northern and southern sectors of Ghana passes through the sub-district. Kintampo, by its location is also an important rest stop for travellers. The rest of the communities off the main road may be reached by together by feeder roads or footpaths. The sub-district has been hooked onto the national grid and therefore there is electricity supply in Kintampo and Babator. Communities get their water supply through boreholes, ponds and streams. Kintampo has pipe borne water supply. For communication, there are telephone facilities and a local FM radio station.

3.4 Justification for area of study

The study was confined to the Kintampo sub-district for the fact that the study period, June-July, coincided with the peak of the rainy season when most other sub-districts in the district were inaccessible due to poor road network. Kintampo sub-district was ideal for the study because it was the only sub district that had some semblance of urban as well as rural settlement. Time constraint was another factor for limiting the study to the Kintampo sub-district alone.

3.5 Determination of Sample Size

i) Households

Considering the expected proportion of households using salt as 10 percent, a confidence level of 95 percent and a margin of error of 5 percent, a sample size of 138 households was arrived at.

There were additional 10 households to cater for unforeseen circumstances making a total of 148 households.

ii) Salt Trader

A census of salt traders in all the selected communities where data was collected was conducted.

3.6 Selection of Sample

The Kintampo Health Research Centre has enumerated all houses (compounds) in the sub-district (about 4000). The sample selection was based on the systematic sampling technique. Specifically, a sampling interval was derived from the total number of houses in the sub-district and the sample size. Using the Table of Random Numbers, a random start was obtained and used to select 148 houses for the study. Within a house one household was selected by balloting where there were more than one household. For eligibility all selected households were to have salt on the day of the survey. A household without salt was replaced by randomly selecting another household within the same house or from the nearest house.

3.7 Tools for data collection

i) Two different structured questionnaires were administered to persons, 15 years or older, who normally cooked the household meals and all salt traders in the communities where the selected houses were located.

iii) A Key Informant Interview Guide was used to obtain information on iodated salt promotion activities of the district.

iv) Testing of Salt

Rapid Test Kits were used to test for the iodine content of salt in all the selected households. All re-bagged salt and 10 samples of sachet salt sold by salt traders were also tested for iodine. The kits were small bottles containing 10 to 15 millilitres stabilised starch- based solution. One drop of the solution placed on salt containing iodine in the form of potassium iodate produces a blue/purple colouration. (WHO, 2001)

3.8. Data collection

Nine field workers of the on-going “Obaapa” vitamin A supplementation study who cover the 17 communities in which the selected houses were located, were recruited and trained for one day as interviewers. One supervisor on the same study was trained to assist. Interviewers were supervised right from the onset of data collection until they became conversant with the questionnaire. Data collection lasted for two weeks.

3.9. Data analysis

There was double entry of data to check inconsistencies and to clean the data. Data were analysed using STATA software. Frequency tables were used to describe the demographic and socio-economic characteristics of the respondents. Cross tabulations, based on the use of iodated salt and selected independent variables were performed. These were: head of household, household size, place of residence, educational level attained, level of knowledge, perceived benefits, availability and affordability of iodated salt and sources of information.

Using 2x2 tables, the associations between the dependent variable (use of iodated salt) and the independent variables (demographic, socio-economic, knowledge, benefits, availability and cost of iodated salt) were determined

3.10. Quality Assurance

An interviewer's guide was prepared for the interviewers, explaining concepts, definitions, and procedures for collecting information. A one-day training programme was organised for the field staff. The training also included field practice to ensure accuracy, consistency and completeness of questionnaires. Finally the completed questionnaires were edited to allow for inconsistencies to be corrected before leaving the community. Questionnaires from the field were received, labelled and properly stored,

3.11. Ethical Considerations

Protocol was observed during community entry. The purpose of the study and what was involved were explained to the communities.. There was absolute confidentiality about information obtained from respondents. Findings from the study were disseminated to the district and sub-district staff.

3.12. Limitations of Study

The rapid test kits give a qualitative estimate of whether iodated is present in salt; it cannot reliably determine iodine concentration as compared to the titration method.

CHAPTER FOUR

4.0 RESULTS

4.1. Household Survey

4.1.1.0. DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

4.1.1.1. Sex of Head of Household, Household Size and Sex of Respondents.

As shown in table 1, a total of 148 households were selected for the study. Out of this, 114 households (77.0 %) were headed by males whilst the remaining 34 households (23.0 %) were headed by females.

Table: 1. Distribution of Respondents by Demographic Factors

SEX OF HEAD	FREQUENCY	PERCENTAGE
Male	114	77.03
Female	34	2.97
Total	148	100.00
HOUSEHOLD SIZE		
1-3	23	15.24
4-6	63	42.57
7-9	41	27.70
10-20	21	14.14
Total	148	100.00
SEX OF RESPONDENTS		
Male	6	4.05
Female	142	95.95
Total	148	100.00

In terms of size, the number of persons in a household ranged from one to twenty persons.

About 43 percent of the household had 4 – 6 persons and that formed the largest group of households. About 70% of the households had 4-9 persons.

In every household, the respondent was a person, aged 15 years or above, who normally cooked the family meals. The result, as indicated in table 1, shows that women did almost all the cooking (96%). Only 4 percent of the respondents were males who cooked for their households.

4.1.1.2. Age of Respondents and Place of Residence

The age distribution of respondents, as shown in table 2, indicates that, majority of the respondents were within the ages 15 and 34 years (64.9%). Respondents in the age group 35-44 were the least (16.2%).

Table: 2. Distribution of Respondents by Socio-Demographic Factors

AGE GROUP	FREQUENCY	PERCENTAGE
15-24	35	23.65
25-34	61	41.22
35-44	24	16.22
45+	28	18.92
TOTAL	148	100.00
PLACE OF RESIDENCE		
Urban	82	55.41
Rural	66	44.59
Total	148	100.00

For the purposes of this study, all sections of Kintampo town were described as urban whilst the remaining communities were labelled as rural. As can be observed in table 2, out of the 148 selected households, eighty-two households (55.4 %) were urban whilst sixty-six (44.59%), were rural.

4.1.1.3. Educational Level and Type of Work

Results on education, as shown in table 3, show that about 46 percent of the respondents had never been to school, 17 percent have had primary education and 39 percent have had middle or JSS education. Those who have had any form of post-JSS education constitutes only about 11 percent of the sample

Table: 3. Distribution of Respondents by Socio-Economic Factors

LEVEL OF EDUCATION	FREQUENCY	PERCENTAGE
None	68	45.95
Primary	25	16.89
Middle/JSS	39	26.35
SSS/Technical/Commercial	12	8.11
Post SSS/Nursing/Teacher Training	2	1.35
Tertiary	2	1.36
Total	148	100.00
TYPE OF WORK		
Farming	54	36.49
Salaried Work	11	7.43
Artisan	14	9.46
Trading	39	26.35
Housewife	7	4.73
Unemployed	23	15.54
Total	148	100.00

For the type of work the respondents were engaged in, about 36 percent of the respondents were subsistent farmers, 27 percent were engaged in trading. Nearly 16 percent said they were unemployed.

4.1.2.0. KNOWLEDGE ON IODATED SALT AND USE

4.1.21. Awareness and Knowledge on Goitre and Benefits of Iodated Salt.

On awareness, respondents were asked whether they have heard about iodated salt or not. The results, as shown on table 4, indicate that awareness was quite high. Majority of respondents, (79 %) were aware, whilst about 21 percent said they were not aware.

Table: 4. Distribution of Respondents by Awareness and Knowledge on Iodated Salt.

HEARD ABOUT IODATED SALT	FREQUENCY	PERCENTAGE
Has Heard	117	79.05
Has Not Heard	31	20.95
Total	148	100.00
KNOWLEDGE ON GOITRE		
Has Knowledge	30	20.27
Has No Knowledge	118	79.73
Total	148	100.00
KNOWLEDGE ON BENEFITS		
High Knowledge	7	4.73
Some Knowledge	57	38.51
No Knowledge	53	35.81
Not Heard of Iodated Salt	31	20.95
Total	148	100.00

Respondents were also asked what they thought caused of goitre. About 20 percent of the respondents gave the right response (lack of iodine), whilst 80 percent did not know the causes of goitre. About the benefits of using iodated salt, respondents who said they have heard about iodated salt were asked to state the benefits of using iodated salt. Three correct responses were

expected. Those who gave all the three responses were classified as having high knowledge. Those who gave two or one of the responses were described as having some knowledge, and those who did not give any right answer were said to have no knowledge. Nearly 8% of the respondents had high knowledge, 43 percent had some knowledge and 36 percent had no knowledge.

4.1.2.2 Source of Information

For those who have heard about iodated salt, their first source of information was as shown in table 5. The channel with the widest coverage was television (24.8%), followed by radio and relative/friend (22.1%), then moving vans (18.00%). Fewer respondents heard about iodated salt from health workers (7.9%) and the least was from salt traders (5.1%).

Table: 5. Distribution of Respondents by first source of information

FIRST SOURCE OF INFORMATION	FREQUENCY	PERCENTAGE
Television	29	24.79
Radio	26	22.12
Health Worker	9	7.91
Relative Friend	26	22.12
Mobile Van	21	17.95
Salt Trader	6	5.12
Never Heard	3	20.45
Total	148	100.00

4.1.2.3. Use of Iodated Salt.

Respondents were asked if they have ever used iodated salt before. Out of the total sample of 148, respondents, eighty-seven, representing 59 percent of the respondents said they have used iodated salt before. About 20% have heard about iodated salt but have never used it before and 21% have never heard about it. The respondents were asked about the type of salt they thought

was in the household on the day of the interview, whether it was iodated or non-iodated. Only 31.1 percent of the respondents said they were using iodated salt.

Table: 6. Distribution of respondents by Use of Iodated Salt

EVER USED IODATED SALT	FREQUENCY	PERCENTAGE
Yes	87	58.79
No	30	20.27
Not Heard of Iodated Salt	31	20.95
Total	148	100.00
SALT BEING USED NOW		
Iodated Salt	46	31.18
Un-Iodated salt	102	68.92
Total	148	100.00
TYPE OF SALT (iodine test)		
Iodated	99	66.89
Non -Iodated	49	33.11
Total	148	100.00

Using test kits, salt in households at the time of the interview, were tested for iodine. The results as shown on table 6, indicate that ninety-nine (66.9%) of households had adequate levels of iodine, but forty-nine (33.11%) did not. From the results on table 6, it can be deduced that, about 54 percent of respondents using iodated salt were not aware they were using iodated salt.

4.1.2.4. Reasons for Use and Non-Use of Iodated Salt.

The eighty-seven (87) respondents who said they had used iodated salt before were asked the main reason for using iodated salt. As shown in table 7, the most important reason given was that it prevents goitre. For “Other Reasons”, the most predominant was that it makes food tasty followed by “has information that it is good”.

Table: 7. Distribution of Respondents by Reasons for Using Iodated Salt.

REASONS FOR USE.	FREQUENCY	PERCENTAGE
Prevents Goitre	42	48.28
Promotes Child Growth	7	8.05
Increases Intelligence	3	3.45
It is Clean/Fine	11	12.64
Other Reasons	18	20.68
Don't know	6	6.80
Total	87	100.00

For the thirty respondents (30) who have heard about iodated salt but have never used it, their reasons for non -use was as shown in table 8. The most important reason given was that iodated salt was not always available. The second most important reason was that it was too expensive.

Table: 8. Distribution of Respondents by Reasons for Non-Use of Iodated Salt.

REASONS FOR NON-USE.	FREQUENCY	PERCENTAGE
It Is Too Sharp	1	3.33
Not Always Available	12	40.00
Too Expensive	5	16.67
Other	7	23.33
Do Not Know	5	16.67
Total	30	100.00

For the “other” responses the important ones were, that they were used to non iodated salt, not interested and has never seen iodated salt before.

4.1.3.0. Availability, Affordability, and Storage of Iodated Salt

Respondents who said they were currently using iodated salt were asked if iodated salt was available. As shown in table 9, fifty-eight representing 39 percent of the respondents said iodated salt was always available but 29 respondents (19.6%) said it was not available

Table: 9. Distribution of Respondents by Availability, ability to Afford and Storage of Iodated Salt

AVAILABILITY OF IODATED SALT	FREQUENCY	PERCENTAGE
Available Always	58	39.29
Not Available Always	29	19.59
Never Head/Used Iodated Salt	61	41.12
Total	148	100.00
AFFORDABILITY		
Can Afford Always	57	38.51
Cannot Afford	30	20.27
Never Heard /Used Iodated Salt	61	41.12
Total	148	100.00
METHOD OF STORAGE		
Covered Container	65	43.92
Uncovered Container	24	16.22
Polythene Bag	59	39.86
Total	148	100.00

About ability to afford iodated Salt, about 39 percent of the respondents said they can always afford iodated salt, 20 percent said they cannot afford, whereas 41.1 percent said they have never used it before. On storage of iodated salt, interviewers were asked to observe the container in which salt had been stored. About 44 percent of households stored salt in covered containers. 40 percent left the salt in the polythene bags and 16% of households stored salt in uncovered containers.

4.1.4.0. Preferences

As shown in figure 1, the most respondents preferred salt colour was white (88%).

Seven percent preferred dark colour and 5 percent had no preference.

Figure: 1. Colour Preferences

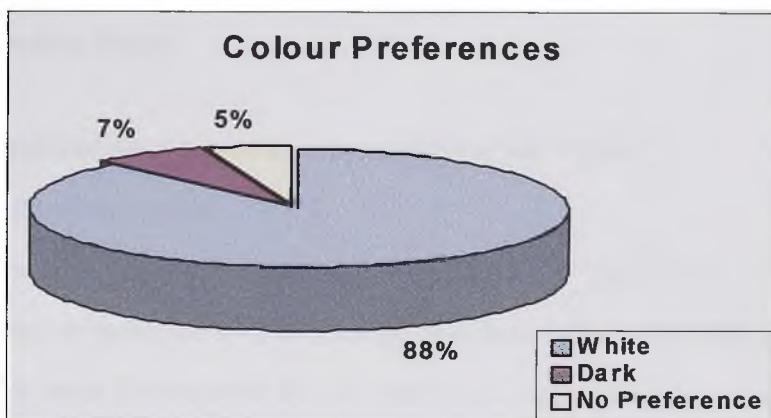
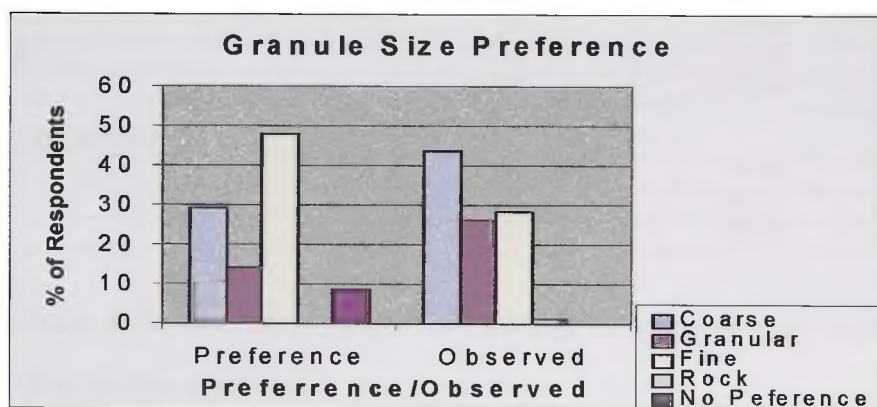


Figure: 2. Granule Size Preferences



As shown in figure 2, most respondents, about 48 percent said they preferred fine salt. This was followed by coarse salt (29.1%) and granular (14.2%). None of the respondents mentioned rock salt and 8.8 percent had no preference. For the type of salt observed in households on the day of interview, coarse salt was the most prevalent (43.9%), followed by fine salt (28.4%) and granular salt (26.4%). Only two households (1.4%) were found using rock salt.

4.2.0. Salt Traders Study

4.2.1. Demographic and Socio-Economic Characteristics of Salt Traders

4.2.1.1 Sex and Place of Residence

A census of salt traders in the selected communities was carried out. In all a total of 107 salt traders were counted, 69 traders (64.49%) in urban and 38 traders (35.5%) in the rural areas.. As shown in table 10, about 17 percent of the salt traders were males whilst the remaining 83 percent were females. Previously, salt selling used to be the preserve of females.

Table: 10. Distribution of Salt Traders by Demographic and Socio-economic Factors

SEX	FREQUENCY	PERCENTAGE
Male	18	16.82
Female	89	83.18
Total	107	100.00
PLACE OF RESIDENCE		
Urban	69	64.49
Rural	38	35.51
Total	107	100.00

About two-thirds of the salt traders (64.5%) were found in Kintampo whilst the remaining (35.5%) were in the other communities.

4.2.1.2 Level of Education of Salt Traders

As shown in table 11, about 32.7 percent of salt traders had never been to school. Approximately 11% have had some basic education (6 years maximum), and a greater proportion (44.9%), have had middle school or JSS education (between 6 and 9 years). Only 11 percent had gone beyond middle school or JSS level.

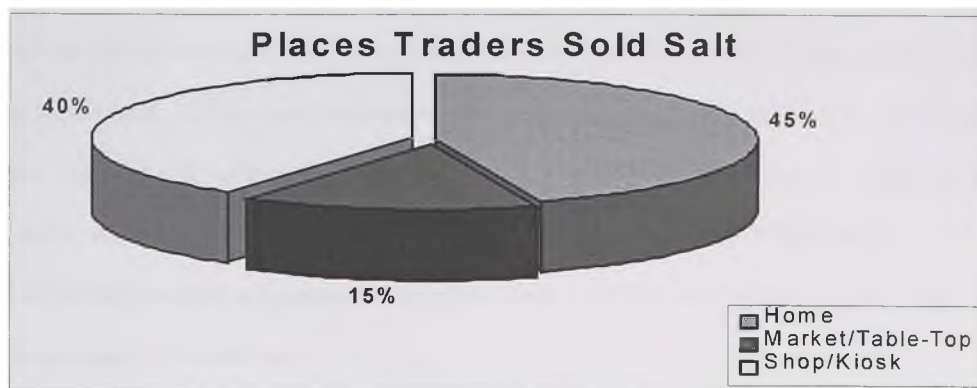
Table: 11. Distribution of Salt Traders by Level of Education

LEVEL OF EDUCATION	FREQUENCY	PERCENT
No Schooling	35	32.71
Primary	12	11.21
Middle/JSS	48	44.86
SSS/Technical/Commercial	9	8.41
Post SSS/Nursing/Teacher Training	3	2.80
Total	107	100.00

4.2.1.3 Place of Sale of Salt

As shown in figure 3, salt was mostly sold in homes. Specifically, 45 percent of salt traders sold

Figure: 3. PLACES WHERE SALT TRADERS NORMALLY SOLD SALT



Salt in the house. Sachet salt was found mostly in shops and kiosks. It means that salt was easily available within the community. Households did not have to go to the market alone to get salt to buy.

4.2.2. Awareness and Knowledge on Iodated Salt.

The salt Traders were asked if they have ever heard of Iodated Salt. As shown in table12, nearly 86 percent of the respondents had heard about Iodated Salt but 14 percent had not.

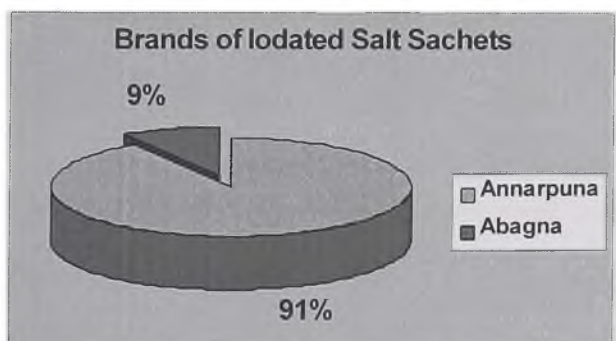
TABLE: 12. Distribution of Salt Traders by Awareness and Knowledge on Iodated Salt

HEARD OF IODATED SALT	FREQUENCY	PERCENTAGE
Heard	92	85.98
Not Heard	12	14.02
Total	107	100.00
LEVEL OF KNOWLEDGE		
High Knowledge	5	4.67
Some Knowledge	59	55.14
No Knowledge	31	28.97
Not Heard of Iodated Salt	12	14.02
Total	107	100.00

About knowledge on iodated salt, the salt traders were asked to state the benefits derived from using Iodated salt. Three correct responses were expected. Only 4.7 percent gave all the three correct responses and were classified as having high knowledge. About fifty-five percent gave one or two correct responses and were said to have some knowledge. Nearly 29 percent did not give any of the expected responses and were described as having no knowledge, and about 14% had never heard of iodated salt.

4.2.3. Brands of Sachet Iodised Salt on the Market

Figure: 4. Brands of Iodated salt sachets



Results of the study indicate that only two brands of sachets of iodated salt, Annarpuna and Abagna were found in the Kintampo Sub- District. As shown in figure 4, the most common brand was Annarpuna (91%).

4.2.4 Iodine Test on Salt Sold by Traders

Test was performed on all 69 re-bagged salt found during the survey. As shown in table 13, out of the total number of samples, 41 (59.4 %) had adequate levels of iodine, whereas 28 (40.6 %) had adequate levels of iodine.

TABLE 13: DISTRIBUTION OF SALT SAMPLES BY IODINE TEST

SALT SAMPLE	IODINE TEST RESULTS					
	Adequate		Inadequate		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Re-bagged Salt	41	59.40	28	40.60	69	100.00
Sachets	8	80.00	2	20.00	10	100.00

For sachets of Iodated Salt, ten (10) samples taken at random were tested for iodine. Eight had adequate levels of iodine whilst two samples did not.

4.3.0 The Effects of the Independent variables on the Dependent Variable

To describe the relationships between the dependable variable and the independent variables, the dependable variable which was the **Level of Consumption of Iodated Salt in Households** was represented by responses from respondents on the following:

1. Whether respondents had ever used Iodated Salt before.
2. Whether respondents think they were using Iodated Salt now in their households or not.
3. Results of iodine test on household salt.

Iodine test result was regarded as a more sensitive indicator of consumption of iodated salt compared to the two others, and therefore it was used more often in this analysis.

For the independent variables, nine (9) factors comprising of demographic, socio-economic, knowledge on IDD, benefits of using iodated salt, availability and affordability of iodated salt were considered. Another factor that was of interest for the purposes of promoting iodated salt was source of information.

4.3.1. Sex of Head of Household and use of Iodine Test Results

As shown in table 14, male-headed households were more likely to use iodated salt compared with female-headed households. About 70 percent of male-headed households as against about 55.9 percent of female-headed households used iodated salt.

TABLE: 14. Distribution of Households by Sex of Head of Household and Iodine Test Results

SEX OF HEAD OF HOUSEHOLD	IODINE TEST RESULTS.					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Male- Headed	80	70.18	34	29.82	114	100.00
Female-Headed	19	55.88	15	44.12	34	100.00
Total	99		49	-	148	

4.3.2. Size of Household and Iodine Test Results.

As may be seen in table 15, the smaller the size the more likely the household will use iodated salt. However, this trend was not followed in the case of households with sizes equal or greater than 10 persons.

TABLE: 15. Distribution of Households by Size and Iodine Test Results

SIZE OF HOUSEHOLD	RESULT OF IODINE TEST.					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
1-3	17	73.91	6	26.04	23	100.00
4-6	43	68.25	20	31.75	63	100.00
7-9	24	58.54	17	41.46	41	100.00
10-20	15	71.43	6	28.57	21	100.00
TOTAL	99	-	49		148	-

4.3.3. Age of Respondents and Iodine Test Results.

As can be seen in table 16, no relationship between age groupings of respondents and iodine test results was observed.

TABLE: 16. Distribution of Households by Age of Respondents and Iodine Test Results.

AGE GROUP	IODINE TEST RESULTS					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
15-24	25	71.43	10	28.57	35	100.00
25-34	39	63.93	22	36.07	61	100.00
35-44	18	75.00	6	25.00	24	100.00
45+	17	60.71	11	39.29	28	100.00
Total	99		49	-	148	

4.3.4. Place of Residence and Ever- Used Iodated Salt

Respondents were asked whether they had ever used iodated salt before. As shown in table 17, for urban respondents, 86.2 percent said they had used iodated salt before as compared with 59.6 percent of rural residents. On the whole 58.8 percent of households had used iodated salt before. Using the Chi- square test, the differences were found to be statistically significant with a Chi-square value of 10.6 and a p-value of 0.005. We therefore reject the null hypothesis that there was no difference between the levels of use of iodated salt for urban and rural respondents.

TABLE: 17. Distribution of Households by Place of Residence and Ever Used Iodated Salt

PLACE OF RESIDENCE	EVER USED IODATED SALT					
	YES		NO		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Urban	56	86.15	9	13.85	65	100.00
Rural	31	59.62	21	40.38	52	100.00
Never Heard	0.00	0.00	31	100.00	31	100.00
Total	87		61	-	148	

4.3.5. Place of Residence and Iodine Test Results

The percentage of households using Iodated Salt in urban area (70.7%) was higher than in the rural areas (62.9%) as indicated in table 18.

TABLE: 18. Distribution of Households by Place of Residence and Iodine test results

PLACE OF RESIDENCE	IODINE TEST RESULTS					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Urban	58	70.73	24	29.27	82	100.00
Rural	41	62.89	25	37.88	66	100.00
Total	99		49		148	

For this study, urban was defined as the Kintampo town, whilst the other communities in the sub-district were defined as rural. Comparing results on responses for ever- used iodated salt and salt test, less urban residents (70.7%) were actually using iodated salt compared to those who said they have ever used iodated salt (86.3%). For the rural areas it was the reverse, more households were actually using iodated salt (62.9%) compared to those that have ever used iodated salt (59.6%).

4.3.6. Level of Education of Respondents and Iodine Test Results

Considering the impact of level of formal education on the use of iodated salt in households, the proportion of households using iodated salt tend to increase with increasing level of education of respondents as indicated in table 19.

TABLE: 19. Distribution of Respondents by Level of Education and Iodine test results

LEVEL OF EDUCATION	IODINE TEST RESULTS					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
No Schooling	38	55.88	30	44.12	68	100.00
Primary	17	68.00	8	32.00	25	100.00
JSS	30	76.92	9	23.08	39	100.00
SSS	10	83.33	2	16.67	12	100.00
Post SSS	4	100.00	0	100.00	4	100.00
Total	99		49		148	
LEVEL OF EDUCATION						
No Schooling/ Primary	55	59.12	38	40.86	68	100.00
Post Primary	44	80.00	11	20.00	80	100.00
Total	99	-	49		148	100.00

The educational level categories were re-grouped based on the premise that, there wasn't much difference between individuals who have only had some primary education and those with no formal education. Also it was observed that very few respondents have had SSS and post SSS education and that may not exert much effect. Two categories of educational levels were therefore created as shown in table 19.

Households in which respondents have had post primary education (80.0%) were more likely to use iodated salt compared to those where respondents have had only primary education or no education (59.0%). The difference was statistically significant with a Chi-square of 6.88 and a

p-value of 0.009. It was suspected that, place of residence, could be a confounding factor, however, the effects could not be accounted for because the sample size was not large enough.

4.3.7. Awareness on Iodated Salt and Iodine Test Results

As shown in table 20, respondents who said they had heard about iodated salt were more likely to come from households which were using iodated salt on the day of the survey (73.5%), as compared with households where the respondents had never heard about it (41.9%).

Table: 20. Distribution of Respondents by Awareness and Iodine Test Results

AWARENESS ON IODATED SALT	RESULTS ON IODINE TEST.					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Heard	86	73.50	31	26.50	117	100.00
Has Never Heard	13	41.94	18	58.06	31	100.00
Total	99	-	49		148	

The difference was found to be statistically significant with a Chi square value of 11 and a p-value of 0.001.

4.3.8. Knowledge on goitre and Iodine Test Results

Results of the study as indicated in table 21, show that households in which respondents knew about the causes of goitre (86.7%), were more likely to use iodated salt as compared with those where the respondent did not know about the causes of goitre (61.86 %).

Table: 21. Distribution of Respondents by Knowledge on Goitre and Iodine Salt Test Results

KNOWLEDGE ON IDD	RESULTS OF IODINE TEST.					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Has Knowledge	58	70.73	24	29.27	82	100.00
Has No Knowledge	41	62.89	25	37.88	66	100.00
Total	99		49	-	148	

4.3.9. Knowledge on Benefits of Iodated Salt and Iodine Test Results.

Just like knowledge on goitre, the study results, as shown in table 22, indicate that the higher the knowledge of respondents on benefits of Iodated Salt the more likely the household will use Iodated Salt. For respondents who had high knowledge, 80 percent of their households were using iodared salt compared to (the least) households of those who had not even heard about iodated salt (41.9%).

Table: 22. Distribution of Respondents by Knowledge on Benefits and Iodine Test Results

LEVEL KNOWLEDGE BENEFITS	OF ON	RESULTS OF IODINE TEST.					
		ADEQUATE		INADEQUATE		TOTAL	
		FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Has High Knowledge		7	100.00	0	0.00	7	100.00
Has Some Knowledge		46	80.70	11	19.30	57	100.00
Has No Knowledge		33	62.26	20	37.73	3	100.00
Not Heard of Iodated Salt		13	41.94	18	58.06	31	100.00
Total		99	-	49		148	

4.3.10. Availability of Iodated Salt and iodine Test Results

Results of the study, as shown in table 23, indicate that, households in which respondents said that they could get iodated salt to buy any time they need it, were more likely to use iodated salt (83.9%), compared to those in which respondent said they could not get iodated salt to buy (58.6%). The differences were found to be statistically significant with a Chi-square value of 24. and a p-value of 0.001. We therefore reject the null hypothesis that there was no difference in the level of consumption of iodated salt for households that could get iodated salt to buy and those that could not. The effects of suspected confounding factors such as place of residence and level of education could not be accounted for due to the small sample size.

**Table: 23. Distribution of Respondents by Availability of Iodated Salt and
Iodine Test Results**

AVAILABILITY OF IODATED SALT.	IODINE TEST RESULTS.					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Available	52	89.72	6	10.34	58	100.00
Not Available	16	55.17	13	44.83	29	100.00
Never Heard/ Used	31	52.63	30	47.37	61	100.00
TOTAL	99		49		148	-

4.3.11. Affordability of Iodated Salt and Iodine Test Results.

As indicated in table 24, the results show that among those who said they can afford iodated salt all the time, nearly 85 percent of their households were using iodated salt compared with 58 percent of households of respondents who said they cannot afford it. For those who said they have never heard of nor used Iodated Salt before, 53 percent were using iodated salt at the time of the survey. The differences found were also statistically significant with Chi-square value of 14 and a p-value of 0.001. Factors which may have confounding effects on this association include education, type of work or income and place of residence. However these could not be accounted for because the sample size was small. We therefore reject the null hypothesis that, there was no difference in consumption levels of households that can afford and those that cannot afford iodated salt.

**Table: 24. Distribution of Respondents by Affordability of Iodated Salt
and Iodine Test Results**

AFFORDABILITY OF IODATED SALT.	RESULT OF IODINE TEST.					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
CAN AFFORD	50	84.75	9	15.25	57	100.00
CANNOT AFFORD	18	58.06	13	41.94	30	100.00
NEVER HEARD	31	53.45	27	46.55	61	100.00
Total	99		49		148	

4.3.12. Source of Information and Iodine Test Results

Findings on the effect of first source of information on household use of Iodated salt as shown in table 25, indicate that television was the most effective channel of information. Nearly 90 percent of households where respondents first learned about iodated salt from television were using iodated salt. Radio (80.8%) and health workers (77.8%) followed sequentially. Information from relatives and friends had the least effect (53.9%).

**Table: 25. Distribution of Respondents by first Source of Information
on Iodated Salt and Iodine Test Results**

FIRST SOURCE OF INFORMATION	RESULT OF IODINE TEST.					
	ADEQUATE		INADEQUATE		TOTAL	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Television	26	89.66	3	10.34	29	100.00
Radio	21	80.77	5	19.23	26	100.00
Health Worker	7	77.78	2	22.22	9	100.00
Relative/Friends	14	53.85	12	46.15	26	100.00
Mobile Van	14	66.67	7	33.33	21	100.00
Salt Sellers	4	66.67	2	33.33	6	100.00
Never Heard of iodated Salt	13	41.95	18	58.06	31	100.00
TOTAL	99	-	49		148	
FIRST SOURCE OF INFORMATION						
Mass Media	61	80.26	15	19.74	76	100.00
Other Media	25	60.98	16	39.02	41	100.00
Never Heard	13	41.94	18	58.06	31	100.00
Total	99	-	49		148	

The channels of information were re-classified into two, mass media, comprising television radio and mobile vans. The second category, “other media” comprised health workers, relatives/friends and salt traders as shown in table 25.

Households where the respondents first heard about iodated salt from the mass media (80.3%), were more likely to use iodated salt compared with where the first source of information was other media (61.0%). The difference was found to be statistically significant. The Chi-square value was 5.08 with a p-value of 0.024. Possible confounding factors may be education, place of residence and income. However, they could not be accounted for in view of the small sample size.

CHAPTER FIVE

5.0. DISCUSSION

One of the process indicators for assessing the success of salt iodation programmes as a strategy for the elimination of IDD is that at least 90 percent of households should be consuming adequately iodised salt. Ghana with support from UNICEF and other donors started the salt iodation programme in 1995 and targeted the elimination of IDD by the year 2001. Being a net exporter of iodated salt, it was expected that Ghana would achieve this target with ease. On the contrary the process has been slow and arduous.

The study results show that awareness about iodated salt in the Kintampo Sub-District was high. Almost 80 percent of the respondents were aware of iodated salt. However, it is a bit low compared with findings from a sister district, the Sunyani District, where awareness was 100 percent (Agble et al, 1999). Only two brands of sachet iodated salt were found. The most common was Annapurna brand (91.2%), followed by Abagna (8.8%). Knowledge on causes of goitre was low. Only 20.3 percent of respondents knew that goitre was caused by lack of iodine in the diet. Again, knowledge on benefits of using iodated salt was also low. Only 42 percent of the respondents had some knowledge whilst the remaining 58 percent had no knowledge at all. The results further showed that respondents who had knowledge on benefits were more likely to come from households that used iodated salt (90%). This has implication for the education component of the programme. The more people become knowledgeable about the benefits of iodated salt, the more likely they will use it. Awareness on iodated salt alone may not be enough.

One of the key findings of the study was that prevalence of iodated salt consumption in households was 66.9 percent. This was an appreciable improvement over findings from previous studies, particularly the 1999 national assessment, which recorded a national prevalence of 22.1 percent (Agble et al, 1999). An assessment study conducted in the Kintampo District in 1998 showed that only 8.1 percent of households were using iodated salt. More urban households (70.7%) were using iodated salt compared with rural households (62.9%). Similar findings were reported by Kwadzo et al in a study conducted for the MOH and UNICEF in 1999, on policy options for universal iodated salt consumption in Ghana. The prevalence level attained was also in consonance with the degree of availability of iodated salt on the market. Findings from the salt traders' survey showed that 53.1 percent of salt traders sold only iodated salt and 59.4 percent of all re-bagged salt found on the market was iodated. Unpublished results of a study by Amoussou-Gohoungo in 2000 in the Hohoe District reported that only 8 percent of salt traders sold iodated salt and prevalence of use in households was also low (16%).

Another important finding was that about 54 percent of households were using iodated salt but the respondents were not aware probably because the salt had been re-bagged and had no identifiable label. These respondents thought that they were using un-iodated salt on the day of interview but the iodine test showed otherwise.

Analysis of results of the study has shown that there are a number of factors that can influence the consumption of iodated salt by households. These include sex of head of household, household size and knowledge on goitre. More male-headed households (70.2%) used iodated salt compared to female headed-households (55.9%). Also the smaller the size of the household

the more likely it would use iodated salt. These situations may be reflections on household income and cost of iodated salt. Also the more knowledge a respondent had about goitre and the benefits of iodated salt, the more likely her or his household would use iodated salt.

Some factors, however, showed statistically significant differences ($p\text{-value} < 0.050$). These included urban-rural places of residence, no formal education/primary education versus education above primary level and availability as opposed to non-availability of iodated salt. Other factors were ability to afford versus inability to afford and mass media as opposed to other media as sources of information. Urban residence, high level of formal educational attainment, knowledge on benefits of iodated salt, ability to find and afford iodated salt and information from mass media enhanced the use of iodated salt. It should, however be pointed out that the sample size did not permit the effects of possible confounding factors to be accounted for. Amoussou-Gohoungo, in the same study reported similar findings in the case of availability and cost of iodated salt.

. Availability and affordability were still important issues affecting the level of consumption of iodated salt in households. Agble et al (1999), Kwadzo et al (1999) and Amoussou-Gohoungo (2002) have reported similar findings. Two unresolved issues may account for these problems.. The first issue is how to integrate small-scale producers, who flood the markets with cheaper un-iodated salt, into the programme. The second issue is how iodated salt could be produced and packaged at affordable cost. It is interesting to note, however, that, 55.2 percent of respondents who said iodated salt was not available and 60.0 percent of those who complained they could not afford iodated salt were actually using iodated salt. These respondents were probably not aware because the re-bagged iodated salt has no identifiable label. Additionally, it may also mean that

re-bagging has made iodated salt more available and affordable. Bulk packaging of 25 and 50 kilogram iodated salt by producers and re-bagging into smaller units by retailers was one of the strategies approved by the Food and Drugs Board in 1998 to reduce the cost of iodated salt and make it available to households.(Agble et al,1999). This decision was taken in view of the fact that the packaging material for salt sachets was the major contributing factor to the high cost of iodated salt production.

Mass media as a powerful channel for disseminating information cannot be denied. About 80 percent of households, where the first source of information on iodated salt was through the mass media, were still using iodated salt at the time of the study. In this respect, it is important to recognise the contribution made by some organisations in the promotion of iodated salt through the mass media. These organisations are: the ADARS FM radio station in Kintampo, Ghana Broadcasting Corporation, and Television, Lever Brothers Ghana Limited, and Prime Time Marketing Agency, In promoting iodated salt, other channels should be strengthened to cater for rural dwellers who may not be reached by the mass media. Salt traders, as important channels of education, particularly for rural households had less satisfactory levels of knowledge. About 40 percent of salt traders had no knowledge at all on benefits of iodated salt. Amoussou-Gohoungo in his study in 2000, found that as much as 70 percent of salt traders in the Hohoe District had low level of awareness on iodated salt.

On storage of iodated salt, about 40% of households stored salt in open containers. This practice as has been pointed out in the literature review can drastically reduce the iodine content of salt. For aesthetic characteristics, the most preferred colour was the white (87.8%). In terms of size, a fine salt was the most preferred (40%). At the time of the study however, coarse salt was the

most prevalent in households (43.9%). Fine salt constituted 28.1 percent of salt in households. This information should be of vital importance for producers in their efforts to satisfy consumers and win larger share of the market.

CHAPTER SIX

6.0. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

The level of awareness on iodated salt is high (80%) but there is still room for improvement. The level of knowledge on causes of goitre was, however very low among the respondents (20.3%). Prevalence of use of iodated salt in households was found to have increased substantially from 8.1 percent in 1998 to 66.9 percent in 2002. Prevalence in Kintampo town (70.7%) is about 9 percent higher than in the other communities (62.1%) in the sub-district. These findings give the hope that the target of at least 90 percent consumption prevalence in households could be achieved in the near future. Two strategies adopted to overcome the nagging issues of availability and affordability, the main bottlenecks militating against the success of the Salt Iodation Programme, seem to be working. First, bulk packaging by producers, as is being done by Panbros Salt Company and subsequent re-bagging into small portions by retailers, seems to have made iodated salt cheaper and more available. This conclusion was based on the fact that about 54 percent (more than half) of households using iodated salt were not even aware that they were using iodated salt. Secondly, packaging into smaller sachets of 250 grams weight, especially the Annarpuna brand, has made iodated salt more affordable and available in the sub- district. Men are now retailing iodated salt sachets in their shops, because the packaging is neat, patronage is good and sales move fast. Hitherto, salt selling was the preserve of females. It should be noted, however, that the challenges of availability and affordability are not over yet.

Factors that promoted the use of iodated salt in households included male heading of households, small household size and knowledge on goitre. Using Chi Square tests, factors that showed statistically significant differences were place of residence, level of formal educational attainment, level of knowledge on benefits of iodated salt, type of media as a source of information on iodated salt, availability of iodated salt in the community and affordability. All the three null hypothesis set on place of residence of respondents, availability and affordability of iodated salt were therefore rejected. Urban residence, higher level of formal educational attainment, high level of knowledge on benefits of iodated salt, mass media as a source of information on iodated salt, availability and affordability enhanced the consumption of iodated salt in households.

6.2. Recommendations.

1. Knowledge about causes of goitre and benefits of using iodated salt should be seen as important incentives for using iodated salt. Hence education on causes of goitre and benefits of iodated salt should be intensified.
2. Appropriate channel for reaching rural communities with information on iodated salt should be found because they may not be reached by mass media as in urban areas.
3. Education of Salt traders should be intensified to enable them carry on more promotion activities on iodated salt, particularly in the rural areas.
4. The District Assembly, so far, has not played any major role on the programme even though it is its prime responsibility. The District Assembly should get more involved by encouraging the formation of functional Salt Iodation Committees and enforcing the law on

iodated salt.. This should be taken seriously to safeguard particularly, the health of the children in the district.

5. Bulk packaging and re-bagging, in addition to pre-packaging as sachets (250g) direct from factories, have so far shown positive signs in tackling the problems of cost and availability and therefore should be encouraged. However a way of labelling re-bagged iodated salt should be found to make consumers aware of what they are buying and consuming because it is their right.
6. The District Health Administration should continue to facilitate the formation of functional Salt Iodation Committees at district and sub-district levels and to assist in mapping out strategies to accelerate the consumption rate to acceptable levels within the shortest possible period and to sustain achievements that will be made.
7. It has become clear that health workers alone cannot succeed in the promotion of iodated salt especially considering the fact that they are few in number. Other stakeholders such as Non Governmental Organisations, Government Agencies, Salt Producers and individuals as well as the media should be encouraged to participate in the promotion of iodated salt.
8. Partnerships, as exists between the District Health Administration, Ghana Education Service, and Lever Brothers, Ghana Limited, (producers of Annapurna salt) through its marketing agent, Prime Time, should be encouraged.
9. Lastly the District Assembly should make all efforts to ensure that all school-aged children are enrolled in school and they remain in school, at least up to the JSS level. This may be the only long term measure of improving not only the consumption of iodated salt but also the general health status of the people in the district

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Appendix 1

HOUSEHOLD CONSUMPTION OF IODATED SALT IN THE KINTAMPO SUB DISTRICT IN THE KINTAMPO DISTRICT	HOUSEHOLD Form No.
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FORMNO

**INTERVIEW WOMEN/MEN AGED 15 – 49+ WHO ARE IN-CHARGE OF COOKING
ONLY**

1. BACKGROUND and ID:

1.1 Interview ID		INTERVI
1.2 House Number		COMPNO
1.3 Village/Community & code		VILLAGE
1.4 Name of respondent		RESPON
1.5 Head of household		HEAD
1.6 Sex of head of household	1. Male 2. Female	HEADSE
1.7 Household size		HSIZE
1.8 Name of interviewer and code:		FW
1.9 Date of visit:		DATEVIS
1.10 Is the community urban or rural?	1. Urban 2. Rural	URBAN

1 SOCIO-DEMOGRAPHIC CHARACTERISTICS:

2.1 Age of respondent		AGE1
2.2 Age category	1. 15 – 24 2. 25 – 34 3. 35 – 44 4. 45+	AGECAT
2.3 Sex of respondent	1. Male 2. Female	SEX1
2.4 What is your religion?	1. Christian 2. Muslim 3. Traditionalist 4. None	RELIGIO
	5. Other: (Specify)	
2.5 Highest educational level reached	1. None 2. Primary school 3. Middle/JSS 4. Technical/commercial/SSS secondary school	EDUCAT
	5. Post secondary – nursing, teacher, polytechnic, etc. 6. Tertiary 8. Not Known	

2.6 What is your main occupation?

1. Farming	2. Salaried worker	3. Artisan	4. Trading
5. Housewife	6. Unemployed	7. Other (Specify)	

WORK1

2.7 Are you currently single, married, or living with a man, or are you widowed, divorced, or separated?

1. Married	2. Living together	3. Widowed
4. Divorced	5. Separated	6. Single, unmarried

MARRIE

2.8 What ethnic group do you belong to?

11. Akan: Bono, Ashanti, Fanti,	12. Bimoda, Chokosi	13. Dagarti, Frafra, Kusasi, Grushie	14. Fulani
15. Ga, Adangbe, Ewe	16. Gonja, Dagomba, Mamprusi	17. Konkomba, Basare	18. Mo
19. Sisala, Wala	20. Zambraba	21. Other (specify)	

ETHNIC1

3. KNOWLEDGE ON IDD AND IODATED SALT

3.1 What causes goitre? [USE THE KEY BELOW TO ANSWER QUESTION 3.1.1. IF SHE MENTIONS 1,

Lack of iodine CIRCLE 1, KNOWLEDGEABLE. CIRCLE 2, NOT KNOWLEDGEABLE FOR ANY OTHER RESPONSE]

1. Lack of iodine	2. Too much talking/crying	3. Phlegm in throat	4. Witchcraft
5. Other (specify)			8. NK

3.1.1 Knowledge of causes of goitre

1. Knowledgeable	2. Not Knowledgeable
------------------	----------------------

GOITRE

3.2 Have you heard about Iodated Salt?

1. Yes	2. No
--------	-------

HEARD1

3.3 What was your main source of information?

11. Television	12. Radio	13. Health worker	14. Community volunteer	15. Relative/friend
16. Mobile van	17. Salt sellers	18. Other (Specify)		99. NA

SOURCE1

3.4 What are the benefits of using Iodated Salt? [USE THE KEY BELOW TO ANSWER QUESTION

3.4.1. IF SHE MENTIONS 1,2 AND 3 CIRCLE 1, HIGH KNOWLEDGE, IF SHE MENTIONS ANY

TWO FROM OPTION 1 TO 3, CIRCLE 2, KNOWLEDGE AND IF MENTIONS 4 OR NOT KNOWN,

CIRCLE 3, LOW KNOWLEDGE]

1. It prevents goitre	2. Makes children grow well	3. It makes children intelligent
4. Other (Specify)		8. NK
		9. NA

3.4.1 Knowledge of benefits of iodated salt

1. High Knowledge	2. Knowledge	3. Low Knowledge	9. NA	BENEFIT
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3.5 Have you ever used Iodated Salt?

1. Yes	2. No	3. NK	9. NA	EVERUSE
--------	-------	-------	-------	---------

IF THE ANSWER TO QUESTION 3.5 IS 2, No, CODE 9, NA FOR QUESTION 3.6

3.6 What is the main reason why you used iodated salt?

1. It prevents goitre	2. Makes children grow well	3. It increases child intelligence	4. It is clean/fine/hygienic	WHYUSE
5. Other (specify)			8. NK 9. NA	

3.7 What is the main reason why you have never used iodated salt?

1. I do not have goiter/not prone to develop goitre		2. I do not like the colour		WHYNUS
3. I do not like size of grains	4. It is too sharp/spoils my food		5. It is not always available	
6. It is too expensive	7. Other (specify)		8. NK 9. NA	

3.8 What type of salt are you using now?

1. Iodated	2. Non Iodated	3. Both	4. No salt	8. NK	SALTNO
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3.9 What is the main reason why you are not using iodated salt now?

1. I do not have goiter/not prone to develop goitre		2. I do not like the colour	3. I do not like size of grains		NOIONO
4. It is too sharp/spoils my food		5. It is not always available		6. It is too expensive	
7. Other (specify)				8. NK 9. NA	

4. AVAILABILITY AND COST

4.1 Do you get Iodated Salt to buy any time you want it?
[9, NA = THOSE WHO HAVE NEVER HEARD OF IT]

1. Yes	2. No	9. NA	GETBUY
--------	-------	-------	--------

4.2 From where do you normally buy your iodated salt?

1. Market place	2. Seller's house	3. Shop/Kiosk	4. Vehicles	BUYSOU
5. Health facility	7. Other (specify)			9. NA

4.3 Can you afford Iodated Salt all the time?

[9, NA = THOSE WHO HAVE NEVER HEARD OF IT]

1. Yes	2. No	3. NA	AFFORD1
--------	-------	-------	---------

5. PREFERENCES

5.1 What size of salt grains do you prefer?

1. Coarse	2. Granular	3. Fine	4. Rock	5. No preference
6. Other (specify)				

PREFSIZE

5.2 What colour of salt do you prefer?

1. White	2. Dark	3. No preference	4. Other (specify)
----------	---------	------------------	--------------------

PREFCOL

6. OBSERVATION

6.1 NOTE AND RECORD THE TYPE OF SALT USED BY THE RESPONDENT AND THE CONTAINER

IN WHICH IT IS STORED

6.1.1 TYPE 1

1. Coarse	2. Granular	3. Fine	4. Rock	5. Other:	9. NA
1. Covered container	2. Uncovered container	3. Polythene		4. Other:	9. NA

TYPE1

6.1.2 STORAGE

STORE1

6.1.3 TYPE 2

1. Coarse	2. Granular	3. Fine	4. Rock	5. Other:	9. NA
1. Covered container	2. Uncovered container	3. Polythene		4. Other:	9. NA

TYPE2

6.1.4 STORAGE

STORE2

6.2 TEST FOR IODINE

6.2.1 TYPE 1:

1. Inadequate (0 – 25)	2. Adequate (50 – 100)	9. NA
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SALTEST

6.2.2 TYPE 2:

1. Inadequate (0 – 25)	2. Adequate (50 – 100)	9. NA
------------------------	------------------------	-------

SALTEST

END OF HOUSEHOLD FORM. CHECK YOUR FORM AND THANK THE RESPONDENT

Appendix 2

HOUSEHOLD CONSUMPTION OF IODATED SALT IN THE KINTAMPO SUB DISTRICT IN THE KINTAMPO DISTRICT	SALT TRADERS Form No. 	FORMNO
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2. BACKGROUND and ID:

1.6 Interview ID						INTERVI		
1.7 Village/Community & code						VILLAGE		
1.8 Name of respondent						NAME		
1.4 Name of interviewer and code:						FW		
1.5 Date of visit:						DATEVIS		
1.6 Is the community urban or rural?	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px 5px;">1. Urban</td> <td style="width: 50%; padding: 2px 5px;">2. Rural</td> </tr> </table>					1. Urban	2. Rural	URBAN
1. Urban	2. Rural							
1.7 Place of selling	1. Home	2. Market/ table top	3. Health facility	4. Shop/Kiosk	SELLING			

3. SOCIO-DEMOGRAPHIC CHARACTERISTICS:

2.1 Age of respondent			AGE			
2.2 Age category						
	1. 15 – 24	2. 25 – 34	3. 35 – 44			
	4. 45+					
	AGECAT					
2.3 Sex of respondent	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px 5px;">1. Male</td> <td style="width: 50%; padding: 2px 5px;">2. Female</td> </tr> </table>			1. Male	2. Female	SEX
1. Male	2. Female					
2.4 Highest educational level reached						
	1. None	2. Primary school	3. Middle/JSS			
	4. Technical/commercial/SSS secondary school					
	EDUCAT					
	5. Post secondary – nursing, teacher, polytechnic, etc.	6. Tertiary	8. Not Known			

2.5 What ethnic group do you belong to?

11. Akan: Bono, Ashanti, Fanti,	12. Bimoda, Chokosi	13. Dagarti, Frafra, Kusasi, Grushie	14. Fulani
15. Ga, Adangbe, Ewe	16. Gonja, Dagomba, Mamprusi	17. Konkomba, Basare	18. Mo
19. Sisala, Wala	20. Zambraba	21. Other (specify)	

ETHNIC

3. Knowledge on IDD and Iodated Salt

3.1 What type of Salt are you selling?

1. Iodated	2. Un-iodated	3. Both	8. NK
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TYPESEL

3.2 Have you heard about Iodated Salt?

1. Yes	2. No
--------	-------

HEARD

3.3 What are the benefits of using Iodated Salt? [USE THE KEY BELOW TO ANSWER QUESTION

3.3.1. IF HE/SHE MENTION 1,2 AND 3 CIRCLE 1, HIGH KNOWLEDGE, IF HE/SHE MENTIONS

ANY TWO FROM OPTIONS 1 TO 3, CIRCLE 2, KNOWLEDGE AND IF HE/SHE MENTIONS 4,

OTHER, OR NOT KNOWN CIRCLE 3, LOW KNOWLEDGE]

1. It prevents goitre	2. Makes children grow well	3. It makes children intelligent
4. Other (Specify)	8. NK	9. NA

3.3.1 Knowledge of benefits of using iodated salt

1. High Knowledge	2. Knowledge	3. Low Knowledge	9. NA
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KNOW

3.4 OBSERVE BRANDS OF IODATED SALT SACHET/SACKS ON DISPLAY

3.4.1 Annapurna

1. Yes	2. No
--------	-------

ANAPUN

3.4.1.1 250 g

1. Yes	2. No	9. NA
--------	-------	-------

G2501

3.4.1.2 500 g

1. Yes	2. No	9. NA
--------	-------	-------

G5001

3.4.1.3 One Kilo

1. Yes	2. No	9. NA
--------	-------	-------

KILO1

3.4.1.4 More than one Kilo

1. Yes	2. No	9. NA
--------	-------	-------

MKIL01

3.4.2 Pambros

1. Yes	2. No	PAMBRO
--------	-------	--------

3.4.2.1 250 g

1. Yes	2. No	9. NA	G2502
--------	-------	-------	-------

3.4.2.2 500 g

1. Yes	2. No	9. NA	G5002
--------	-------	-------	-------

3.4.2.3 One Kilo

1. Yes	2. No	9. NA	KILO2
--------	-------	-------	-------

3.4.2.4 More than one Kilo

1. Yes	2. No	9. NA	MKILO2
--------	-------	-------	--------

3.4.3 Abagna

1. Yes	2. No	ABAGNA
--------	-------	--------

3.4.3.1 250 g

1. Yes	2. No	9. NA	G2503
--------	-------	-------	-------

3.4.3.2 500 g

1. Yes	2. No	9. NA	G5003
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3.4.3.3 One Kilo

1. Yes	2. No	9. NA	KILO3
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3.4.3.4 More than one Kilo

1. Yes	2. No	9. NA	MKILO3
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3.4.4 Amina and Hawa

1. Yes	2. No	AMINA
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3.4.4.1 250 g

1. Yes	2. No	9. NA	250G4
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3.4.4.2 500 g

1. Yes	2. No	9. NA	500G4
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3.4.4.3 One Kilo

1. Yes	2. No	9. NA	KILO4
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3.4.4.4 More than one Kilo

1. Yes	2. No	9. NA	MKILO4
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3.5 What is the main reason for not selling Iodated Salt?

1. Not available	2. Too expensive	3. Does not sell fast	4. Not heard of it	NOTSELI
5. Other (specify)			8. NK 9. NA	

4 AVAILABILITY AND COST OF IODATED SALT

4.1 Where do you get your Iodated Salt?

1. From the big city – (Outside Kintampo)		2. From moving vans	3. Traders bring it to market	SOURCE
4. From distributors (in Kintampo)	5. Other (specify)		9. NA, has not heard of iodated salt	

4.2 Is it always available?

1. Yes	2. No	9. NA, has not heard of iodated salt
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AVAIL

4.3 How much does the following cost:

4.3.1 250 g sachet iodated salt

4.3.2 500 g sachet iodated salt

4.3.3 One Kg sachet iodated salt

4.3.4 One cup (margarine tin) iodated salt

4.3.5 One cup (margarine tin) un-iodated salt

COST250

COST500

CKILO

IODCUP

UIODCUP

4.4 Which one does your customers normally buy?

1. 250 g sachet iodated salt	2. 500 g iodated salt
3. ½ cup (margarine tin) iodated salt	4. One cup (margarine tin) iodated salt
5. ½ cup (margarine tin) un-iodated salt	6. One cup (margarine tin) un-iodated salt

AFFORD

4.5 What do your customers say about the cost of iodated salt?

1. Expensive	2. Affordable	3. No complain	4. Other (Specify)	9. NA
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COMPLAI

5. TESTING OF SALT FOR IODINE (TEST ON ONLY RE-BAGGED SALTS)

5.1 Salt test:

5.1.1 Sample 1:	1. Inadequate (0 – 25)	2. Adequate (50 – 100)	9. NA
5.1.2 Sample 2:	1. Inadequate (0 – 25)	2. Adequate (50 – 100)	9. NA
5.1.3 Sample 3:	1. Inadequate (0 – 25)	2. Adequate (50 – 100)	9. NA
5.1.4 Sample 4:	1. Inadequate (0 – 25)	2. Adequate (50 – 100)	9. NA

TEST1

TEST2

TEST3

TEST4

END OF SALT TRADERS FORM. CHECK YOUR FORM AND THANK THE RESPONDENT

Appendix 3

Guide for Key Informant Interview District Nutrition Officer

- (1) When and where was the programme on Iodated Salt launched?
- (2) Has the District Health Administration in collaboration with the District formed any committee?
- (3) What are these committees and when were they formed?
- (4) What roles do they play and what contributions have they made so far
- (5) How often do the committees meet?
- (6) Do you have any minutes of meetings?
- (7) What activities have the District Health Administration undertaken so far?
- (8) What other organization have been involved in the promotion of iodated salt and what contribution have they made?
- (9) What are the challenges you face in promoting iodated salt?
- (10) In your opinion what can you say about the success or failure of the programme
- (11) Why do you think it has succeeded or failed?
- (12) Do you have the support of the District Health Administration particularly District Director of Health Services?

Appendix 4

COMMUNITIES AND SELECTED HOUSES

Village	Frequency	Percent	Cumulative
Agyegyemakunu	7	4.73	4.73
Asante Akura	3	2.03	6.76
Awa	1	0.68	7.43
Babator	10	6.76	14.19
Bronikrom/Yefri	3	2.03	16.22
Kintampo	82	55.41	71.62
Kofi Kume	1	0.68	72.30
Koofiekrom	4	2.70	75.00
Mangoase/Dagomb	4	2.70	77.70
Nkurakan	3	2.03	79.73
Ntankoro	7	4.73	84.46
Oforikrom	3	2.03	86.49
Pumpuatifi	5	3.38	89.86
Punpuano	2	1.35	91.22
Soronuase	6	4.05	95.27
Tankofo-Boabengfo	6	4.05	99.32
Yenkyirikrom	1	0.68	100.00
Total	148	100.00	

Appendix 5

SAMPLE SIZE CALCULATION

Formula:

$$n = \frac{t^2 \times P(1-P)}{m^2} \text{ (WHO, 1994).}$$

n = required sample size

t = confidence level

p = estimated prevalence

m = margin or error.