

REPORT ON

LOCAL SALT IODATION ACTIVITIES

IN KASEMPA AND KAPUTA

DISTRICTS OF ZAMBIA

By

Eustine Mulenga Besa

B.A Communications/Sociology
Communication Officer -NFNC
Head - Comm. Unit

Raider Habulembe - Mugode

Dip. Food and Nutrition;
Post.grad. Dip. Food and Nutrition
Nutritionist - NFNC

National Food and Nutrition Commission
Funded by
Unicef

December, 2001

Table of Contents

Item	page
Executive Summary	
List of Figures	
List of Table	
Acknowledgement	
Abbreviations	
1.0 Introduction	
1.1 An Overview of IDD	
1.2 Government's Actions to Eliminate IDD	
1.3 Local Salt Mining in Zambia	
1.4 Salt Mining in Kasempa & Kaputa	
1.5 Salt Iodation in Kasempa & Kaputa Districts	
2.0 Purpose of the Study	
2.1 Overall Objective	
2.2 Specific Objectives	
3.0 Methodology	
3.1 Selection of Salt Mining Areas	
3.2 Selection of Salt Mining Areas	
3.3 Tools Used and Sampling	
3.4 Data Analysis	
4.0 Results	
Part 1	
4.1 Salt Producers	
4.1.1 Background Information	
4.1.2 Salt Production	
4.1.3 Salt Iodation	
4.1.4 Packaging	
4.1.5 Salt Quality	
4.1.6 Training	
4.1.7 Knowledge on Salt Legislation	
4.1.8 Cooperatives	

4.1.9 Salt Storage

Part 2

4.2 Salt Traders

4.2.1 Background Information

4.2.2 Type of Salt Sold

4.2.3 Knowledge on Legislation

4.2.4 Knowledge on IDD's

Part 3

4.3 Salt Consumers

4.3.1 Background Information

4.3.2 Educational Background

4.3.3 Age of Respondents

4.3.4 Salt Commonly Bought

4.3.5 Use of Iodated Salt

4.3.6 Addition of Salt During Cooking

4.3.7 Storage of Salt at Household Level

4.3.8 Knowledge on Iodine Deficiency Disorders

5.0 Salt Iodation Process

6.0 Mini - Laboratories

7.0 Achievements Made so Far

8.0 Constraints to the IDD Programme

9.0 Appendixes

9.1 Appendix 1 Salt Iodation Figures

9.2 Appendix 2 Mini-Laboratory

9.3 Appendix 3 Questionnaires

9.4 Appendix 4

9.5 Appendix

9.6 Appendix

9.7 Appendix

List of Figures

Page

Figure 1	Production Constraints
Figure 2	Salt Being Iodated After Production
Figure 3	How Salt is Packaged
Figure 4	Quality of Salt Produced
Figure 5	Awareness on Government
Figure 6	Limitation to Observation Government
Figure 7	Belonging to Cooperative
Figure 8	
Figure 9	
Figure 10	How Salt is Sold
Figure 11	Salt Commonly Bought
Figure 12	Health Benefits Mentioned
Figure 13	Addition of Salt During Cooking
Figure 14	Storage of Salt at Household Level
Figure 15	Prevention of Goitres
Figure 16	Salt Production Process

List of Tables

Page

Table 1	Salt Production
Table 2	Salt Sold After Production
Table 3	How Salt is Packaged
Table 4	Quality of Salt Produced
Table 5	Local Salt Being Sold
Table 6	Reasons for not selling Local Salt
Table 7	Awareness on Statutory Instrument
Table 8	Heard of Iodated Salt
Table 9	Respondents Buying Iodated Salt
Table 10	Health Benefits
Table 11	Respondents Buying Iodated Salt
Table 12	Prevention of Goitre
Table 13	Salt Iodation Figures
Table 14	Mini Laboratory - Determination for Potassium Iodate

Executive Summary

This is the assessment report of the local salt iodation program in Kasempa and Kaputa districts since the inception of the iodation program in 1998. The National Food and Nutrition Commission (NFNC) conducted the study with financial and logistical support from UNICEF. The local iodation¹ has been part of the national strategy in the control of Iodine Deficiency Disorders in Zambia to complement other efforts such as legislation on salt iodation, monitoring of salt iodation and installation of mini laboratories in some districts. Kasempa and Kaputa districts are four main districts where local salt mining is done. UNICEF procured two local iodation machines in order to assist the local communities in iodating the local salt. This was intended to enable them comply with the national legislation which requires that all salt for human and animal consumption be iodated.

The main aim of the study was to assess the progress made in establishment of local salt iodation system and the level of participation of the stakeholders in the program in the two areas. Assessing of the adherence to procedures in the iodation of salt and the knowledge, attitude and practices of the producers, traders and consumers of local salt were also part of the objectives. The study was a cross sectional study that was conducted over the period of 5 days; 3 days in Kaputa and 2 days in Kasempa. Respondents were randomly sampled as producers(n=107), traders(n=62) and consumers(n=108) of local salt in the two districts. To collect the data semi-structured questionnaires and checklists were used. Observations and review of iodation records were also done.

Since the inception of the program a total of 66,512kg and 27,380kg salt has been iodated in Kaputa and Kasempa respectively. On average the salt producers are able to make 10 bags of 50 kilograms per month during the production season (June to November). Most of the producers do experience a number of constraints that include mainly obtaining of raw materials and equipment meant to help in the iodation process from the point of mining to storage and sale of salt.

From the results it can be extrapolated that only half of the salt producers iodated all their salt and only a third did not iodate their salt at all. Comparison of the two districts showed that in Kasempa the majority of the producers (82.5%) iodate all their salt whilst in Kaputa only a third (34.3%) iodate all their salt. Reasons cited for iodating the salt include; to follow government regulations and prevent IDD's. For those that do not iodate their salt the reasons included the cost aspect; that it was more expensive and hence resulted in the iodation of only that for home consumption.

With regard to adherence to the iodation procedures, most producers have been following the procedures although some problems have been experienced. The machine operators had been trained on how to add iodine in salt but the measurement tools such as spoons were incorrectly recorded. These were specifically on the grams

¹ Iodation is the process of adding iodine to salt meant for human and animal consumption.

for the spoon and the amount of salt iodated at a time was sometimes less than the 20kgs that is supposed to be iodated at a time.

In the case of packaging, over half of their salt was packed in ordinary bags and not in polyethylene plastic bags as recommended to retain iodine. This is mainly because they are the types of bags that are available in the area. Other types of bags used are jute sacks and traditional packs such as leaves. Of the types of bags thought to be the best in Kasempa the polythene plastic bag was more common (50%) whilst in Kaputa the ordinary sacks (80.3%).

Most producers (82.4%) indicated that they keep the salt on elevated platforms in order to allow air to circulate. At household level to maintain the iodine levels it is recommended that the salt is stored in airtight containers. Of the consumers interviewed 71.3% indicated that they store their salt in this recommended way, with 18.5% using plastics and 4.6% storing it in open air. The level of practice was satisfactory but has a lot of areas for improvement.

Of the salt traders interviewed only half (54.4%) sold traditional salt and the rest sold imported salt. On the consumers part the preferences in buying iodated or non-iodated salt traditional as compared to imported salt findings showed that 71.3% use iodated salt with marked differences between the two districts showing 93.8% in Kasempa and 25% in Kaputa. Other than the use of iodated salt the way it is used is important as to continue maintaining the iodine levels that the salt needs to be added at the end of cooking. On the contrary the adding of salt at the end is uncommon and only 15.7% of consumers.

Most producers (64.8%) and traders (70%) indicated that they were aware of the salt legislation. However they indicated that there are limitations in complying with regulations and the main reason indicated was lack of equipment. The knowledge level in relation to the importance of using iodated salt of the consumers interviewed showed that 47.2% use it to prevent goitre, with 18.5% indicating that it is in order to improve health.

Regarding training of salt producers, only the miners in Kasempa were trained in salt quality improvement. 75% of the miners were trained and a few of these had already started using the new method. This was because the mining season had just begun since the training

Only about 20% of salt producers indicated that they belonged to a cooperative, however, not much has been done in terms of salt trading using cooperatives because they had just been formed.

There were several constraints faced by the programme such as resistance to change by the community because of fear of losing the right to mine the salt and lack of representation of miners in the IDD committee. The changes in the IDD focal person on the district level in Kaputa affected the program implementation. The other constraints being faced are that districts regard the IDD programme as a vertical program, lack of some key equipment, long distances between the iodation machines and lack of a standardised reporting system for the districts.

To improve on the program activities, there is need to; find a way of taking the equipment that are required nearer to the miners; intensify education programme on the salt storage and importance of the good packaging material. Miners, especially in Kaputa need to be trained in improvement of quality of salt and intensifying education on salt legislation. Strategies should be developed to encourage cooperative formation in the two areas and linking them to markets where their salt can be sold. The machine operators need reorientation on machine maintenance and potassium iodate addition.

The neighbourhood committees found in communities are important institutions in terms of health matters. Training of these members as IDD programme promoters would help intensify on health education. The trained members and machines operators would require bicycles to cover long distances to other members.

Due to the vastness of the salt pans, it is recommended that more iodation machines be made available to the communities to ease the process of iodation and to reduce on the distances that need to be covered by salt miners. Kaputa particularly has more salt pans and salt miners and therefore need more machines

Enforcement of salt legislation by Health inspectors is a crucial aspect in this program. This would encourage the miners iodate their salt.

In conclusion, the findings suggest that a lot needs to be done to improve on the program especially in Kaputa.

Acknowledgement

The National Food and Nutrition Commission would like to thank the following:

- UNICEF for the financial and logistical support rendered for this review, both in Kaputa and Kasempa districts.
- DHMTS staff for their valued responses during the interview and for providing extra transport during the assessment. The teachers who actually went out in the salt pans and the communities to carry out the interviews.
- The communities who so generously spared their time to talk to the interviewers and finally NFNC staff for entering the data and all those who contributed in one way or the other to facilitate writing of this report. All the valued comments are appreciated.
- NFNC staff for entering the data.

Abbreviations

DHMT	-	District Health Management Team.
IDDS	-	Iodine Deficiency Disorders
I.Q	-	Intelligent Quotient.
PPM	-	Parts Per Million
TGR	-	Total Goitre Rate
NFNC	-	National Food and Nutrition Commission
SPSS	-	Statistical Package for Social Scientists
WHO	-	World Health Organisation
UNICEF	-	United Nations Children's Fund
ZRA	-	Zambia Revenue Authority.

1.0 Introduction

1.1 An Overview of IDD's

An estimated 1571 billion people worldwide live in iodine deficient environments and are thus at risk of Iodine Deficiency Disorders (IDDs). 20 million of these are believed to be significantly mentally handicapped as a result (WHO, 1994).

Zambia like many developing countries has been heavily affected by IDD's. A national wide study on IDD's done in 1971 in all provinces (8) showed a goitre prevalence of 50.5%. The 1989 and 1992, studies on goitre in Zambia found prevalences of 18% (Livingstone) and 68% (Choma) . In 1993 another national wide survey on goitre in school children by Dr Lumbwe showed a national rate of 32%. A review of impact of salt iodation done in Zambia in July 1997 in Southern and Eastern provinces by WHO, showed a reduction of goitre rate to 4.5-16% and 3.62% respectively. The same study indicated that 94% of salt samples collected at household level contained more than 25 ppm indicating adequate iodine intake.

In 1998, a survey carried out in Kasempa and Kaputa among school children showed TGR of 43% and 16% respectively. In both districts, the study revealed that the prevalence was higher among girls. There were no visible goitres in Kaputa district in the same survey. Salt samples were collected from households and tested for iodine

levels. It was found out that 65.9% and 61.9% of salt samples from Kasempa and Kaputa respectively had iodine levels below 30ppm.

Iodine deficiency disorders include irreversible mental retardation, goitre, reproductive failure (still birth, spontaneous abortions), increased child mortality, and socio-economic compromise. Mental performance especially I.Q levels of children born to iodine deficient mothers is about 15% lower than those of non-deficient groups.

The most vulnerable groups are women of reproductive age and children. The most devastating effects are seen in children because they need iodine for proper mental and physical development.

Several forums recognised micronutrient deficiencies as a public health problem worldwide. The World Summit for Children (New York, 1990), Conference on Ending Hidden Hunger (Montreal, 1991) and International Conference on Nutrition agreed that IDD's elimination was one of the most achievable of the goals set for the year 2000. Therefore salt iodation has been universally agreed as the best means to provide iodine to deficient areas as it is simple, practical and effective. Endocrinologists agree that only as little as a teaspoonful of iodine taken over the period of a life time can spell the difference between normal development and iodine deficiency disorders (UNICEF, 1995).

1.2 Government's Actions to Eliminate IDD's

Zambia imports more than 90% of its salt and depends on salt iodation for its source of dietary iodine because the soils are very poor in iodine. In order to support salt iodation, several activities have been carried out as indicated below:

- Legislation on salt iodation was developed in 1978 with little enforcement. In July 1994, the Statutory Instrument was revised and by 1996 it was being enforced by most government bodies. The S.I requires that all salt for both human and animal consumption be iodated.
- Training of Zambia Revenue Authority (ZRA), and public health staff in monitoring of salt at port of entry, wholesale, retail and household levels.
- Local salt iodation machines were introduced in 1998 in the two main local salt mining areas to ensure that all salt mined locally is iodated.
- Creating awareness on use of iodated salt has been one of the major activities done in the districts. With the support from UNICEF, NFNC has provided financial and technical support for this activity. The main targets were producers consumers, teachers, chiefs, councilors and policy makers.
- Monitoring to ensure effectiveness of testing salt through provision of field test kits were provided to all districts for monitoring purpose in 2001. Mini laboratories were set up in five boarder towns and 2 local salt mining areas. This was meant to cut down on time and distance required to send samples to the main laboratories in Lusaka.

- Training of salt producers in Kasempa in improving the quality of local salt. In Kaputa, the training is expected to take place around June 2002.

1.3 Local Salt Mining in Zambia

Although Zambia import's most of its salt, there are still some areas where salt is locally mined. The main ones are in Kasempa and Kaputa districts. Several other areas also mine salt locally but no studies have been done to establish how the quantity of salt and how many miners are producing salt. The known areas are Chiengi, Mpika in chief Chabala's area, Kazungula salt pans in Livingstone, Kalabo salt pans, Bimbi salt pan in Siavonga, Namwala, Chilambwa spring in Monze..

1.3 Salt Mining in Kasempa and Kaputa

Kasempa district in the North Western Zambia has a population of 55,894 (2000-census report), while Kaputa has a population of 86,608. Kaputa is situated in the Northern part of Zambia, sharing the boarder with Democratic Republic of Congo Dr. The main activities in Kasempa are salt mining and small scale farming mainly the grain. In kaputa, salt mining and fishing are the main economic activities.

According to the locals in the above two areas, salt mining has been going on as far back as the 1800. It has been a way of life and source of income for many households. Local salt is the most commonly used in the two areas compared to imported salt. The salt is

also transported and sold in neighboring districts such as Mporokoso, Nchelenge, Mununga and in the Democratic Republic of Congo in the Northern province and to districts such as Kabompo in the Northwestern province.

There are a number of small-scale producers scattered around the districts. It is reported by the locals and through the Farmers Association that Kaputa has over 350 salt miners spread in more than 10 salt pans. (See appendix iv for names of salt pans). Kasempa has about 250 local salt miners all mining salt in one big salt pan called Kaimbwe, the biggest salt pan that stretches over 10km area springing from a hot spring (the Mbanda).

1.4 Salt Iodation in Kasempa and Kaputa Districts

Since the Zambian law requires that all salt for human and animal consumption should be iodated, NFNC with support from UNICEF started a local salt iodation program. In 1998, UNICEF provided 4 local salt iodation machines and along with the machines for each area were 50 kg bags of potassium iodate². Several machine operators were oriented on how to operate machines and add iodine to salt. The communities were also trained on how to check for iodine levels in salt using rapid field test kits. Salt iodation process in Kasempa started much earlier, i.e. September 1998 while Kaputa started in February 1999.

2.0 Purpose of the Study

² Potassium iodate is used for iodating salt due to its high stability. For each 20 bags, 3 grams of $K I_3$ should be added to get about 100 ppm.

Since the inception of the local salt iodation program, several activities have been carried out in an effort of promoting use of iodated salt. The study was meant to assess how far the two areas have gone in terms of addressing the problem of Iodine Deficiency Disorders through the salt iodation and to find out the level of participation of the local stakeholders.

2.1 Overall Objective.

The overall objective was to assess the status of local salt iodation in Kaputa and Kasempa districts since the inception of the programme in 1998.

2.2. Specific Objectives

The specific objectives of the study were:

- To assess whether the iodation procedures are being adhered to.
- To assess the level of knowledge, skills, attitudes and practice of the producers, traders and consumers of local salt.
- Assess the type of partnerships that can enhance sustainability of the local salt iodation programme.

3.0 Methodology

3.1 Selection of Salt Mining Areas

The producers interviewed in Kaputa were from the three biggest salt pans, Kabwe, Chichenchelebwe and Shikayamba. The producers in Kasempa were mainly from Kankolonkolo and Nselauke catchment areas and Kaimbwe area.

3.2 Selection of Respondents

The producers were randomly picked from the salt pans, some from the villages in the catchment areas mentioned. The consumers in Kasempa were also randomly chosen from the villages, sampling the Sansanya and Mushinge villages and Kamambokwe and Muselepete villages. Others were picked from the boma area - right upto Mukinge girls secondary school. In Kaputa the consumers were picked from the villages surrounding the salt pans, including the boma area and the teachers' houses around the salt pans and the boma.

3.3 Tools Used and sampling

Three semi-structured questionnaires were used for salt producers, traders and consumers.

- 60 were targeted in Kasempa and 80 in Kaputa.
- 40 consumers were targeted in Kasempa and 60 in Kaputa.
- 20 traders were interviewed in Kasempa while 40 were targeted in Kaputa.

Apart from the semi-structured interviews the following were done;

- Discussions were held with district staff and the chiefs.
- Physical checks at the iodation machines were made.
- Observations during iodation.
- Record review. Records on iodation since the programe was initiated were also collected and compiled by year, month and the amount of salt iodated.

Teachers in the district were recruited by the district coordinators to administer the questionnaires.

3.4 Data Analysis

Data was analysed using Epi info to present findings in the districts. Cross tabulations were done to relate spacific base data such as age, sex and... with knowledge and practice.

4.0 RESULTS

4.1 Salt Producers

4.1.1 Background Information

A total number of 107 producers were interviewed in both Kaputa and Kasempa with 40 of them coming from Kasempa, while 67 were from Kaputa district.

44.9% of the miners were males, while 54.2% of them were females. 1 person could not be accounted for.

In terms of marital status, 76.6% were married, 11.2% divorced, 3.7% widowed and 7.5% were single. Marital status for 1% of miners was not known.

The educational background of the miners varied in the two areas. Most of them had little or no education, accounting for 62.6%, while 28% had gone up to upper primary school. Only 8.4% had gone up to junior secondary school.

The respondents interviewed ranged between 15 years and above 50 years old. 40.2% of these were 30 years and below while 12.1% were above the age of 50 years. The other 46.7% were in the age group 31 years to 50 years.

4.1.2 Salt Production

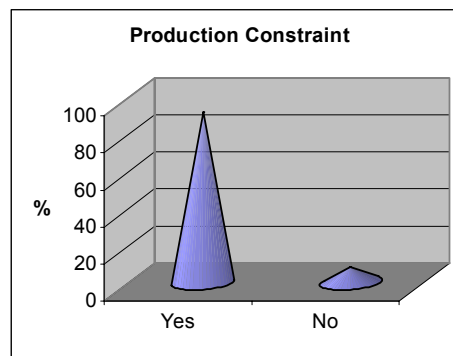
Almost all the producers interviewed (88.5%) produced only up to 10 bags of 50 kgs salt per month during the production season that is, from June to October. A few of them produced more than 10 bags but these only accounted for 10.6%. Only one producer said he produced more than 21 bags in a single months. In Kaputa 92.5% producers produced up to 10 bags and 7.5% produced more than 10 bags while in Kasempa 81.1% produced up to 10 bags and 16.2% more than 10 bags. Only one person produced more than 20 bags (Table below)

Table 1

Salt Production		
No. of Bags	Freq.	%
<10	92	88.5
11-20	11	10.6
21-30	1	1.0
31-40	-	-
>40	-	-
Kaputa		
<10	62	92.5
11-20	5	7.5
21-30	-	-
31-40	-	-
>40	-	-
Kasempa		
<10	30	81.1
11-20	6	16.2
21-30	1	2.7
31-40	-	-
>40	-	-

Almost all the producers (91.6%) mentioned that they do face production constraints while 8.4% did not face any constraints.

Figure 1

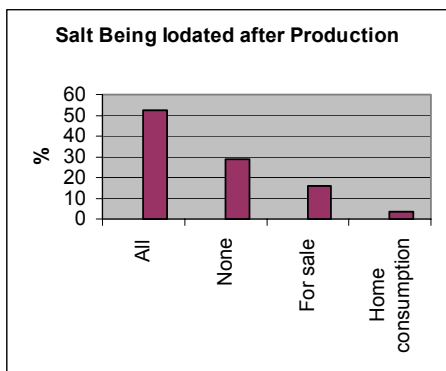


There were more constraints reported (94%) in Kaputa than Kasempa (87.7%). The main production constraints cited was that of raw materials followed by equipment. This accounted for 42.1% and 38.3 % respectively. The equipment cited ranged from lack of aluminium pots, plastic or aluminium dishes, filters and machinery like wheel barrows to help transport raw materials from the salt pans. Asked how they thought salt production could be improved, most of them 43.7% thought making raw materials easily available would help improve their salt production. 35.9% others thought salt production in their area could be improved through provision of required proper equipment, 13.5% thought co-operatives would help, and 6.7% gave other ways of improvement. 14 of the 107 (13.1%) miners mainly in Kasempa said strengthening co-operatives would improve salt production in the area.

4.1.3 Salt Iodation

Only 52.3% of the producers said they iodate all their salt. 28.8% of them said they did not iodate any of their salt. 15.9% said they iodate only salt meant for sale and 3.7% said they iodate only for home consumption.

Figure 2



Comparing the two districts, the majority of the people (82.5%) in Kasempa iodate all the salt. 5% iodate salt for sale only and 2.5% do not iodate any salt. In Kaputa however only 34.3% iodate all salt produced while 22.4% iodate only for sale. The remaining 43.3% do not iodate any salt. In Kaputa non of the producers iodate salt for home consumption while in Kasempa 10% do so.

Table 2

Salt Sold after Production		
Salt Sold	Freq.	%
Kaputa		
All	23	34.3
None	29	43.3
Only for sale	15	22.4
Home onsumption	-	-
Kasempa		
All	33	82.5
None	1	2.5
Only for sale	2	5.0
Home onsumption	4	10.0

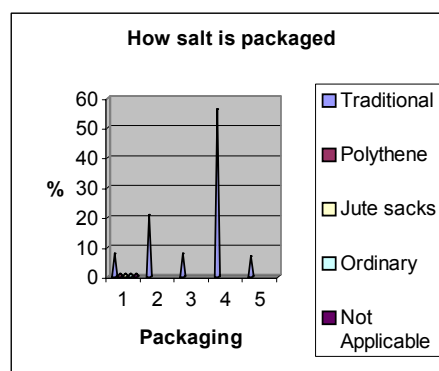
A number of reasons were advanced for their actions. Some of the reasons for salt iodation included responses like, 'it is a government regulation (6.6%)', 'for prevention against iodine deficiency (39.9%)'. A few that only iodated salt for home consumption said it was cheaper (3.8%) to iodate only for home consumption. 46.2% had other reasons for iodating the salt while 3.6% had no reasons. More people in Kasempa (70%) mentioned prevention of IDD while 21.5% in Kaputa had this reason. The majority

(64.6%) of the respondents in Kaputa had other reasons and 9.2% do iodate salt due to government regulation.

4.1.4 Packaging

Most of the producers (56.4%) pack their salt in ordinary bags because those are the ones that are available. Apart from the fact that these are the ones available, other reasons given were that salt does not lose moisture, that it was easy to carry and to prevent iodine loss. 20.8% pack their salt in plastic polythene bag, 7.9% use jute sack and another 7.9% still use traditional packs.

Figure 3



In Kaputa, ordinary sacks (83.2%) were more commonly used followed by traditional packs (4.6%), plastic polythene bags (1.5%) and 10.8% did not indicate any method. More people (50%) used plastic polythene bags in Kasempa. The second most common method was use of Jute sacks (22.2%) followed by the traditional pack (13.9%) and 8.3% used ordinary packs (table 3).

Table 3

How Salt is Packaged

Salt Sold	Freq.	%
Kaputa		
In traditional packs	3	4.6
Polythene bags	1	1.5
Jute sacks	-	-
Ordinary bags	54	83.2
N/A	7	10.8
Kasempa		
In traditional packs	5	13.9
Polythene bags	20	55.6
Jute sacks	8	22.2
Ordinary bags	3	8.3
N/A	-	-

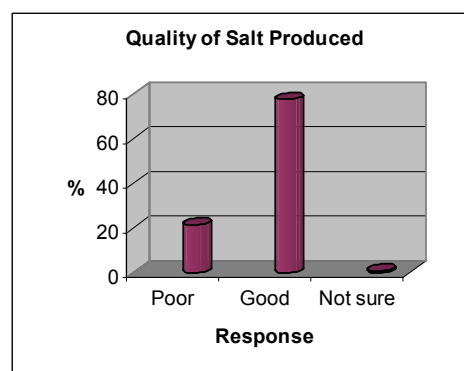
When asked which method they thought was the best for packaging the salt, 51.4% opted for the ordinary sacks, 43.3% plastic polythene bags, 2.9% jute sacks and 3.8% used traditional packs and 1% did not give any answer. The best method chosen in Kaputa was ordinary sack (80.3%) while use of polythene plastic bag was more common (84.6%) in Kasempa. Only 15.2% thought plastic polythene bags were the best in Kaputa.

Of the 4 producers who choose traditional packs as the best way of packaging salt, 1 said it prevented loss of iodine and 3 had other reasons. 43 producers favored plastic polythene bag. Of these, 15 stated that salt did not lose moisture, 1 thought it was easy to carry, 4 said it prevented loss of moisture 10 thought it was more hygienic, 2 saves time, 2 said salt did not get wet and 8 had other reasons. Another 3 people opted for Jute sacks 1 indicating that salt did not lose moisture, 1 said it was hygienic and 1 had other reasons. 50 producers thought ordinary bags were better. Of these, 5 said salt did not lose moisture, 4 said it was easy, 1 thought it prevented loss of iodine, 6 thought it was hygienic, 1 said salt did not get wet, and 32 had other reasons.

4.1.5 Salt Quality

An attempt was made to seek the salt miners' perception of the quality of the salt they produce. Many of them (77.6%) said their salt was good while the remaining 21.5% said their salt was of poor quality. One person was not sure (0.9%) (see graph below).

Figure 4



Of the 82 producers who said their salt was good, 22.9 said the salt is white, 10 said salt was white and not watery, 10 said it was cheaper, 1 saw it as being cheap and highly salted, 1 thought it was highly salted, 8 said it was white and marketable while 35 had other reasons. However, the responses differ between the two districts. In Kasempa more people (92.5%) thought their salt was of good quality compared to 70.1% people in kaputa. 29.9% and 7.5% in Kaputa and Kasempa respectively thought their salt was poor.

Producers were asked to give their opinion on what they thought could be done to improve the quality of their salt. 33.7% were for the view that using right equipment was the right way, 13.1% said adding salt, 11.2% using correct procedure, 4.7 thought they needed technical support from experts, 7.4% did not give any response and 23.5% had other reasons apart from the above. In both areas,

most producers suggested that using the right equipment could improve salt quality (22.4% and 35% in Kaputa and Kasempa). 25% in Kasempa suggested using correct procedure and only 3 % opted for this method in Kaputa. 14.9% producers in Kaputa and 12.5 % in Kasempa suggested addition of iodine.

4.1.6 Training

Training of miners on salt quality improvement took place in Kasempa while in Kaputa plans are underway to train miners. Only 34.4% miners indicated that they were trained. 47.8% were not trained. 17.8% did not indicate whether they were trained. 1.9% in Kaputa were trained while 67.9% were not trained. 30.2% did not indicate anything. In Kasempa, 81.1% of salt miners were trained. Only 18.9% were not trained.

Table 4

Quality of Salt Produced		
Response	Freq.	%
Yes	31	34.4
No	43	47.8
N/A	16	17.8
Kaputa		
Yes	1	1.9
No	36	67.9
N/A	16	30.2
Kasempa		
Yes	30	81.1
No	7	18.9
N/A	-	-

An effort was made to find out whether the miners who were trained tried the new method. 40.0% had tried the new method, 9.1% had not tried it and 50.9% did not give any answer.

Several reasons were given for not trying the new method. The majority (18.6%) said the process was not clear, 5.7% mentioned lack of equipment, 2.9% thought the method was time consuming and were used to old

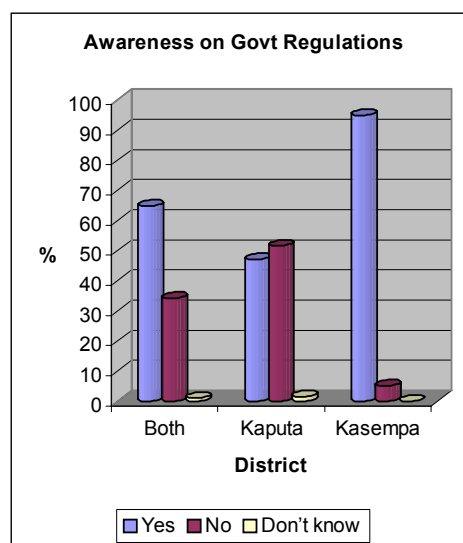
procedure. 7.1% had other reasons while 43% did not give any reason.

4.1.7 Knowledge on Salt Legislation

It was deemed important to find out whether the miners knew about the government regulations on salt requirements.

More than half (64.8%) of the respondents had heard about government regulations on salt. Only 1 person was not sure while 34.2% were not aware.

Figure 5



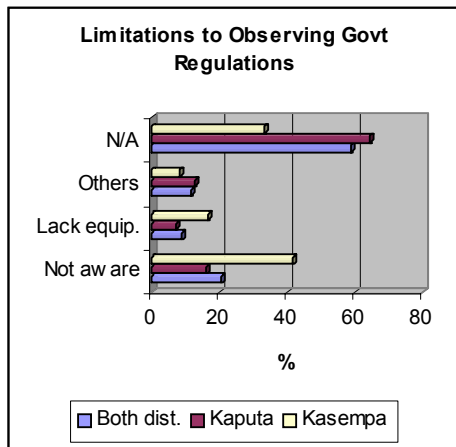
However, in Kasempa almost all salt miners (92.5%) were aware of the regulation compared to Kaputa where less than half (46.3%) of respondents were aware. 5.0% and 50.7% were not aware in Kasempa and Kaputa respectively. Only a few miners (1.5%

Kaputa and 5.1 Kasempa) were not sure (See above graph).

Barely half (59.8%) of the miners actually did think that the regulations applied to them as local salt producers. The rest either did not think the regulations applied to them or they were not sure or didn't know. 94.6% of salt miners in Kasempa agreed that the regulations apply to them, 2.7% did not know while the 2.7% did not say anything. In Kaputa as low as 36.4% thought regulations apply to them. 12.7% said they did not apply to them, 23.6% did not know and 18.1% did not give any answer.

The main limitations to observing the government regulations mentioned by respondents were that they were not aware of it (20.6%), do not have equipment (8.8%), 11.8% had other reasons and 58.8% did not mention any reason.

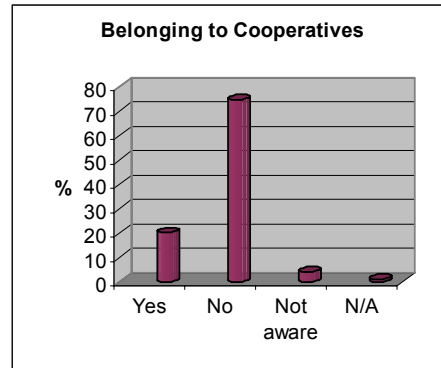
Figure 6



4.1.8 Cooperatives

The issue on cooperatives could only apply to the producers in Kasempa who had been trained on IDD which includes a component on cooperative formation. Only 20 or (18.7%) of the producers belonged to cooperatives.

Figure 7



None reported to have done anything in their cooperatives and the main reason cited was that cooperatives had just been formed. None had sold their salt through the cooperatives yet.

4.1.9 Salt Storage

Most of the salt for sale is stored on elevated platforms accounting for 82.0% of the respondents while 10.0% is stored directly on the ground. 4% had different way of storing while the other 4% did not indicate how they store their salt.

Figure 8

Graph

The salt for home consumption is stored in airtight containers according to 46.7% of respondents. 21.5% said they keep their salt in plastics, while about 10.3% said they keep it in open containers. 1.9% store salt in traditional packs and 19.6 had other ways. The scenario was similar in both districts.

Figure 9

Graph

4.2 Salt Traders

4.2.1 Background Information.

A total of 62 traders were interviewed in the two districts; 23 in Kasempa and 39 in Kaputa. More than half (55.2%) of the traders were female while 44.8% were males. 41 or 66.1% of them were married while, 14.5% were divorced. The other 19.4% were widowed. Many of the traders 67.7% had only gone up to upper primary school; with 17.7% having no formal education at all. With regard to age, 77.4% were below 40 years with about half of them being in the category, 21-30 years.

4.2.2 Type of Salt Sold

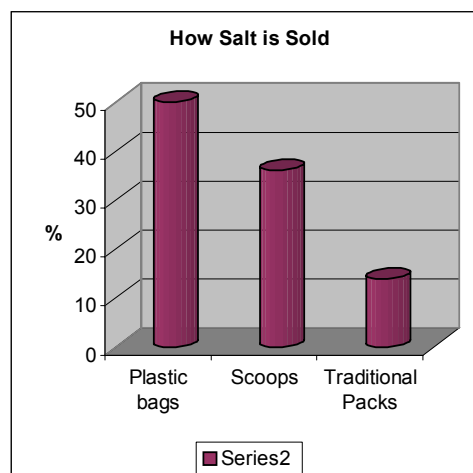
Just above half of the respondents (54.1%) said they did sell traditional local salt. In Kaputa 66.7% stated that they sold local salt and 33.3% did not. As few as 28.6% respondents sold local salt in Kasempa and the remaining 71.4% did not sell any local salt (see table 5).

Table 5

Local Salt Being Sold		
Response	Freq.	%
Yes	33	54.1
No	28	45.9
Kaputa		
Yes	26	66.7
No	13	33.3
Kasempa		
Yes	6	28.6
No	15	71.4

Again of these who said they sold local salt, 50% of them said they packaged the salt in plastic bags, while 36.1% said they use scoops and 13.9% sold in traditional packs as indicated in the graph below.

Figure 10



There were more people using plastic bags in Kasempa (85.7%) compared to Kaputa where only 42.9% used plastic bags. 14.3% and 39.3% use scoops in Kasempa and Kaputa respectively. 17.9% still use traditional packaging in Kaputa and non in Kasempa.

Of those who said they did not sell local salt, 36.1% said they did not stock the local brand because it was of poor quality. 13.9% said the packaging was not good, 27.8% said because the local salt had no iodine. 22.2% gave a range of different reasons for not stocking the local salt. Of those who said they did not sell local salt in Kasempa 17.6% thought it was of poor quality, 23.5% stated that packaging was not good, 35.3% salt was not iodated 23.5% had other reasons. In Kaputa more people (50.0%) thought it was of poor quality, 5.6% said packaging was not good, 22.2% said salt was not iodated, 22.2% had other reasons.

Table 6

Reasons for not selling local salt		
Reason	Freq.	%
Poor Quality	13	36.1
Poor Packaging	5	13.9
Not Iodated	10	27.8
Others	8	22.2

Kaputa		
Poor Quality	9	50.0
Poor Packaging	1	5.6
Not Iodated	4	22.2
Others	4	22.2
Kasempa		
Poor Quality	3	17.6
Poor Packaging	4	23.5
Not Iodated	6	35.3
Others	4	23.5

Asked how the traders thought the local salt could attract more consumers, a good number of them (67%) said the quality of the salt, especially the colour should be improved, 12.3% said the salt had too much moisture. Another 2.3% said the packaging should be improved. A few others either mentioned different ways or could not say how they thought their local salt could attract more consumers.

4.2.3 Knowledge on Legislation

On average most (70.5%) of the traders were aware of the statutory instrument on salt but more people were aware in Kasempa (81%) compared to Kaputa (64.1%) (See table below). Of the 50 respondents who said yes, 38 (76%) of them mentioned salt as a requirement, only 4 of the 50 mentioned labelling (8.7%). 10.9% of the respondents stated quality standards.

Table 7

Awareness on Statutory Instrument		
Response	Freq.	%
Yes	43	70.5
No	18	29.5
Kaputa		
Yes	25	64.1
No	14	35.9
Kasempa		
Yes	17	81.0
No	4	19.0

In Kasempa, nearly all respondents (94.1%) mentioned salt iodation as a requirement while 68.8% in Kaputa. Labelling was mentioned by 15.4%

and 6.3% in Kasempa and Kaputa respectively. Very few (9.4% and 7.7%) thought quality of salt is included in legislation in both Kaputa and Kasempa respectively.

4.2.4 Knowledge on IDD's

90% of the traders interviewed see people with swellings in the necks. 54% of them said the swellings were caused by lack of iodine in the salt. A good number of them (30.5%) did not know the cause of the swellings, while a few 7% attributed the swellings to heredity. The rest gave other reasons but none related to witchcraft.

All respondents (100%) in Kasempa had seen people with swellings compared to 84.6% in Kaputa. 76.2% of respondents in Kasempa attributed causes of swelling in Kasempa and 43.2% had this reason in Kaputa. Others thought it was heredity (8.1% Kaputa and 5.3% Kasempa). 35.1% did not know while 13.5% had others reasons in Kaputa.

Asked how we can prevent goitres in Zambia, more than half (58.6%) of the traders mentioned correct answers while the rest either gave wrong answers or said they did not know. More people (89.5%) were able to give correct answer in Kasempa compared to Kaputa where 44.7% gave correct answers.

4.3 Salt Consumers

4.3.1 Background Information

The total number of respondents were 108. The majority of them were from Kaputa district (55.6%) while 44.4% were from Kasempa district (table 1). Of all the respondents only 39.8% were males while 60.2% were females.

Most of the respondents (69.4%) were married; 14% were single, 11.1% were divorcees and 3.7% were widowed. The marital status was not known for about 0.9% of them, (table 3). In both districts there were more married people interviewed, followed by the divorcees in Kaputa (11.7%) and single in Kasempa (22.9%). There were very few widowed respondents in both areas.

4.3.2 Educational Background

35.5% of respondents at least reached upper primary school. 20.4% went as far as junior secondary, 10.2% senior secondary, 5.65 above senior Secondary, 14.8% Lower primary while 13.9% had no formal education. In both districts the majority of the respondents reached upper primary.

4.3.3 Age of Respondents

Most of the respondents (40.7%) were aged between 21-30 years. 35.2% were aged between 31-40 years, 9.3% between 41-50 years, 6.5% were over 50 years. Only 8.3% of respondents were aged between 15-20 years. Age difference was not seen between the two districts. In Kaputa the majority of respondents were aged between 21-30 years (45%) while in Kasempa it was between 31-40 (37.5%) (Appendix v, table 5).

4.3.4 Salt Commonly Bought

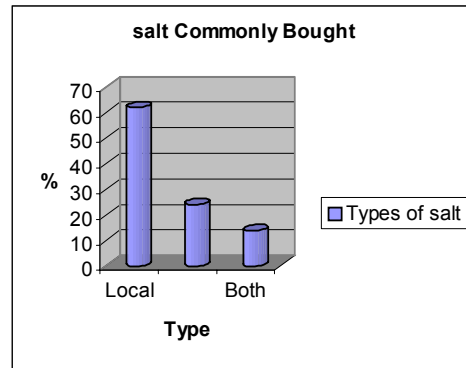
Most respondents (62%) were using locally produced salt (See graph Below). The reasons for their choice varied; some said it was cheap, others said it was easily available, contains iodine, got accustomed to it and others still said it was the best salt. More people in Kaputa thought it was cheaper. In Kasempa more people

thought it was more easily available and contains iodine. More people are accustomed to it in Kaputa than in Kasempa.

In both areas 24.1% were using imported salt. The reasons given for using imported salt were that it contains iodine, its hygienic, is of good quality and few said it is easily available and makes food taste better.

13.9% used both types of salt because they are both not available all the time and they both contain iodine. More respondents in Kasempa said both contains iodine.

Figure 11



The trend differs in the two districts. In Kaputa local salt is most preferred (83.3%) than in Kasempa where only 35.4% respondents were buying local salt. 8.3% and 43.8% imported salt is being bought in Kaputa and Kasempa respectively. Only 8.3% in Kaputa and 20.8% in Kasempa buy both types of salt.

4.3.5 Use of Iodated Salt.

The majority of the respondents (79.6%) had heard of iodated salt. However, there was more awareness in Kasempa (95.8%) than in Kaputa (66.7%). Only 4.2% had not heard of iodated salt in Kasempa and as much as 33.3% in Kaputa (table below).

Table 8

Heard of Iodated Salt		
Response	Freq.	%
Yes	86	79.6
No	22	20.4
Kaputa		
Yes	40	66.7
No	20	33.3
Kasempa		
Yes	46	95.8
No	2	4.2

Respondents had different sources of information. Of all the 108 interviewed, only 22.2% heard of IDD from community meetings. 38.9% out of 108 heard from health workers, 2.8% from the radio, 1.9% from the clinic, 9.3% from neighbours and 6.5% had other sources. In both Kaputa and Kasempa, the main source was from health workers (26.7% and 54.2% - Kaputa and Kasempa respectively) and community meetings (20%- Kaputa and 25% - Kasempa). The other sources on average accounted for 2.8% radio, 1.9% clinic, 9.3% neighbours and 6.5% for other reasons (table 8-13).

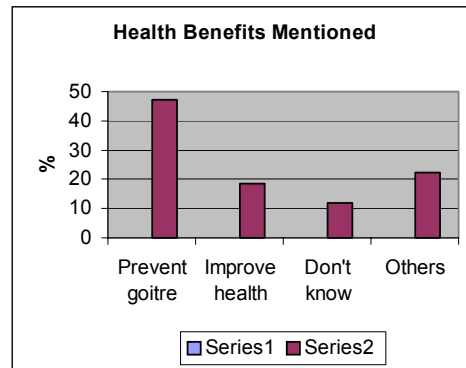
Both iodated and non iodated salt is found in the two areas. 71.3% respondents use iodated salt, 8.3% do not and 15.7% do not know what kind of salt they buy. Comparing the two districts, almost all respondents in Kasempa (93.8%) use iodated salt, 4.2% did not know what kind of salt they buy. In Kaputa only about half of the population use iodated salt, 15% do not use iodated salt and 25% were not sure of the type of salt they use (table below).

Table 9

Respondents buying Iodated Salt		
Response	Freq.	%
Yes	77	71.3
No	9	8.3
No answer	22	20.3
Kaputa		
Yes	32	53.3
No	9	15.0
No answer	19	31.7
Kasempa		
Yes	45	93.8
No	-	-
No answer	3	6.3

Since 1998, the communities were being educated on the health benefits of using iodated salt. Among the consumers interviewed 69.4% knew the health benefits and 29.6% did not know any. Almost all the consumers (95.8%) in Kasempa knew the benefits while only 48.3% in Kaputa (table 5). The most commonly known benefit was prevention of goitre (47.2%). The second most common benefit was improving health (18.5%). 12% did not know any benefits, 22.2% had other reasons.

Figure 12



Only 31.7% consumers in Kaputa and 66.7% in Kasempa cited prevention of goitre as the health benefits. Concerning improving health, 15.0% in Kaputa and 22.9% in Kasempa cited this reason. 20% and 2.1% in Kaputa

and Kasempa respectively did not know any health benefits (table below).

Table 10

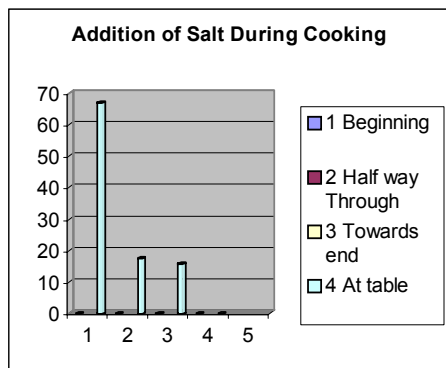
Health benefits		
Benefits	Freq.	%
Kaputa		
Prevent goitre	19	31.7
Improve Health	9	15.0
Don't know	12	20.0
Other	20	33.3
Kasempa		
Prevent goitre	32	66.7
Improve Health	11	22.9
Don't know	1	2.1
Other	4	6.3

On the whole, Kasempa residents seem to be more knowledgeable about the use of iodated salt and its benefits.

4.3.6 Addition of salt during cooking

To prevent loss of iodine in salt, salt is supposed to be added towards the end of cooking especially food which cook for longer hours. Of all the consumers interviewed only 15.7% add salt towards the end of cooking. The majority (66.7%) add salt at the beginning of cooking and 17.6% add half way through. None of the respondents add salt only on the table.

Figure 13



50% of the respondents who said they add salt at the beginning of cooking

said they do so because it mixes well with the relish. 33.3% said it improves taste, 9.7% had other reasons while 6.9% gave no reason. Of those who add salt half way through cooking 31.6% said it mixes well with relish, 21.1% thought it improves taste, and 47.1% had other reasons. 17.6% of respondents who said they add salt towards end of cooking do so because it improves taste while 82.3% had other reasons apart from the above four reasons. The most common reason apart from the four was to retain iodine in salt.

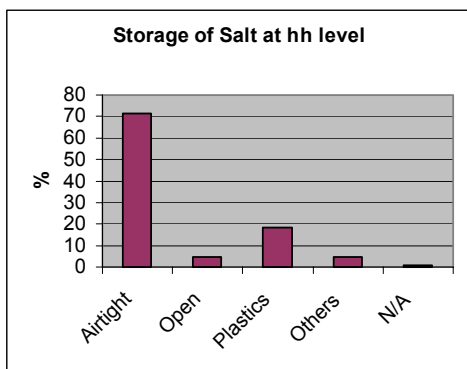
Comparing the two districts, 42.1% in Kasempa thought adding salt at the beginning mixes well with the relish and 52.8% in Kaputa had the same reason. 52.6% and 26.4% in Kasempa and Kaputa respectively thought it improves taste. 33.3% if those who add it half way through cooking said it improves taste, while others said it mixes well with the relish(33.3%) and 33.3% had other reasons the major one being that it retains salt. 17.6% add salt at end of cooking in Kasempa and 82.3% had other reason as above. None of the respondents add salt towards end of cooking in Kaputa.

There were more consumers adding salt at the beginning of cooking in Kaputa (88.3%) compared to Kasempa where only 39.6% still follow this practice (table 17).

4.3.7 Storage of Salt at household level

To maintain good iodine levels, salt is supposed to be stored in air tight containers and plastics. A majority of respondents (71.3%) indicated that they store salt in air tight containers. 18.5% store in plastics, 4.6% in open containers while 4.6% use other methods (see graph below).

Figure 14



The trend is similar in both districts. However in Kasempa, no respondents reported storing salt in open container (table 18).

4.3.8 Knowledge on Iodine Deficiency Disorders

Nearly all consumers (89.8%) interviewed had seen people with goitre. More people with goitre were seen in Kasempa (97.9%) than in Kaputa (83.3%). The main causes cited were, " no iodine in salt- (46.3%) followed by heredity (9.2%), witchcraft 5.6%. 20.3% indicated other reasons and 18.5% did not know the cause. The common reasons, which were mentioned as other causes, were that 'the disease come just like any other disease' or 'by drinking cold water from one of the streams in Congo'. Only 1 person mentioned local salt as the cause of goitre.

Table 11

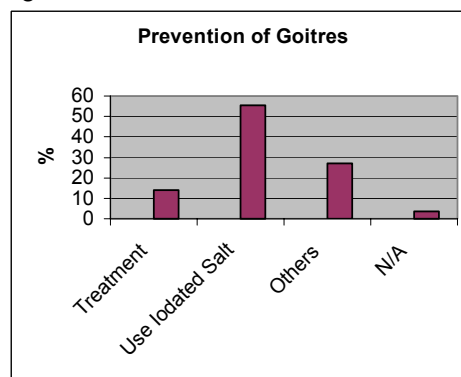
Response	Freq.	%
No iodine in local salt	50	46.3
Witchcraft	6	5.6
Heredity	10	9.2
Don't know	20	18.5
Others	22	20.3
Not applicable	1	0.9

Kaputa		
No iodine in local salt	12	20.0
Witchcraft	5	8.3
Heredity	7	11.7
Don't know	18	30.0
Others	17	28.3
Not applicable	-	-
Kasempa		
No iodine in local salt	38	79.2
Witchcraft	1	2.1
Heredity	3	6.3
Don't know	2	4.2
Others	4	8.3
Not applicable	-	-

In spite of all health and nutrition education done in the two districts, only 20% in Kaputa cited lack of iodine as the cause of IDD's while the majority did not know the cause. 79.2% in Kasempa cited lack of iodine as the reason for goitre.

The suggested methods for prevention of goitre is use of iodated salt (55.6%) and treatment (13.9%). 26.9% suggested other methods other than the above. These included methods like using tattoos, seeking medical advice and by not taking salt from local mines.

Figure 15



85.4% respondents mentioned use of iodated salt and 10.4% treatment in Kasempa. In Kaputa only 31.7% thought iodated salt could prevent goitre, 16.7% mentioned treatment while the majority had other reasons.

Table 12
Prevention of Goitre

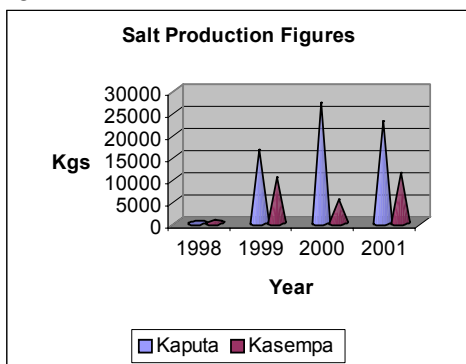
Response	Freq.	%
Kaputa		
Treatment	10	16.7
Use of Iodated Salt	19	31.7
Others	38	46.7
Not Applicable	3	5.0
Kasempa		
Treatment	5	10.4
Use of Iodated Salt	41	85.4
Others	1	2.1
Not Applicable	1	2.1

The respondents were asked were they got most of the information on IDD's 40.7% got it from health workers, 13.9% community meetings, 13.9% neighbours, 2.8% Radio and 1.9% clinic. 11.1% had other sources other than the above. Some of the respondents said they learnt at school, from nutrition clubs and from the markets. 26.7% of Kaputa respondent and 58.3% in Kasempa got information from health workers. (Table 23).

5.0 Salt Iodation processes

Since the inception of the iodation program, about 66,512 and 27,380 Kgs have been iodated in Kaputa and Kasempa respectively as indicated in the graph.

Figure 16



Fluctuations observed in the graph could be as a result of relaxation in

terms of monitoring salt iodation in the two districts. It was reported that months when there is constant monitoring, more people iodated their salt. When officers relax less people iodated salt.

All machine operators were trained on how to add iodine in salt and work with little or no payment all. All clients iodating salt are recorded in the books which are kept by the machine operators.

In 1999, problems with the iodation have been experienced with the machine operator.

In Kaputa West, a teaspoon which is supposed to be included as 3 grams, was being recorded as 4 grams. However, this was corrected within July 2001. In Kaputa East each teaspoon is being recorded as 2 grams and this has continued to date. The machine operator in Kaputa East informed the team that he normally adds two heaped teaspoons of potassium iodate (1 heaped teaspoon is about 7 grams each) for each 20kg. The reason given for this, is that the colour does not change much with 1 teaspoon of potassium iodate. The recommended amount is 3 grams per 20kg of salt. This gives about 80-100ppm. This could have contributed to very high levels of iodine in some salt samples as in appendix II.

About 20kg of salt is supposed to be iodated at a time, but records show that amounts less or more than 20kg are iodated at a time. Amounts such as 15kg, 25kg, 35kg, 50kg were recorded as being iodated. This was more common in Kaputa East.

Record books get tone so easily.

6.0 Mini Laboratories

The mini laboratories were installed in the two areas in February - March 2001. The main aim was to confirm the iodine content of some salt samples which appear not to have iodine. This was important to cut the distant and cost when taking the samples to Food and Drugs Control Laboratory in Lusaka.

The Samples being analysed in the laboratory were collected by district staff as part of routine for public health activities. The laboratory technicians also sometimes collect samples from the salt mines, households and retail shops to test for potassium iodate (appendix II).

The table in appendix II shows that there is inconsistency in the amount iodine being added in salt. In some as high as 2078.68 ppm and to as low as 0 ppm were recorded.

Major problems faced by the technician is that it is difficult to get distilled water because it is not available within the district. Sometimes he has to travel to Kasama to get it.

7.0 Achievements made so Far

1. In Kaputa the DHMT has assisted miners in salt iodation by reducing the burden of carrying a lot of bags of salt iodation for long distance. A plan was devised where the machine is being rotated in the villages.
2. Kasempa district conducted a training for the leaders to help resolve some problems in the community.

3. Kaputa district has also made a proposal on sustainability of the programme to Chief - through CBoH, although they had not received any response so far.
4. All health centres neighbourhood health committee are sensitised on IDD
5. Mini laboratories have been set up.
6. IDD programme was included in the district action plans.

8.0 Constraints to the IDD programme

- Resistance to change by the community because of fear of losing the right to mine the salt.
- In the past years the actual salt miners in Kaputa were not represented in the committee and thus in decision making. This made most miners resist the programme.
- In Kaputa there has been some changes on the IDD focal person on the district level. This slowed down the programme activities as it required a lot of reorientation for the new person.
- IDD programme is still regarded as a vertical programme in Kaputa. If the programme is not supported from central level very little or no money is allocated to IDD programme by the DHMT, despite being included in the action plan.

- Equipment is not easily available such as 3 grams spoons and pokers for sampling salt from the bags making it easy for operators to make mistakes when adding iodine to salt
 - Distances between the iodation machines are hindrances to iodation, especially during the peak period when the miners have a lot
- of customers. Salt is very heavy to carry to where machines are placed
- Lack of a standardised reporting system for the districts.

8 Discussion

Improving Salt Quality/Production

In order for miners to produce a lot of salt that can be supplied to most parts of the country and to improve the quality of salt, there is need for easy access to raw materials and equipment. This was recognised by miners themselves. At the moment most of them use old equipment which make the salt look dark. The above should be accompanied by good training to impart skills and knowledge about IDD and importance of iodating the salt. In Kasempa where most miners were trained, they had more knowledge on salt iodation. The miners were not able to access the required equipment because it is not easily found in the area. Improved ways of salt process in not practiced in Kaputa because training had not taken place.

Salt Consumption/use

The whole process of salt production, processing, transportation, storage and utilisation requires proper handling of salt in order to preserve the iodine added to it.

The results of the study indicate a possibility of low iodine consumption in the two areas due to poor packaging and storage. Consumption of iodated salt in the two areas is still low since only half the salt producers do iodate their salt. Salt is still being packed in ordinary bags which makes salt moist and may result in iodine loss. On average, majority of the people buy iodated salt but only 53% do so in Kaputa.

The recommended packaging is a polyethylene bag for 20kg or more quantities. Plastic bags are ideal for small quantities which can be easily use up. In household kitchen a more closed container is ideal for ready to use quantities. Only about 20.8% traders use the recommended packaging. Packaging problem is more pronounced in Kaputa probably due to lack of training and inadequate health education. The other contributing factors to this could be lack of availability of the required packaging materials.

After packaging salt it expected to be stored in closed closures which are well ventilated. Exposure to heat (sun, heating) makes iodine unstable. The majority of salt producers stored salt in the correct way in both districts. Some families built

separate huts for salt storage because of fear of damaging the main house due to leakage. This problem was also mentioned in the 1998 KAP study report for Kaputa.

Since salt is the best vehicle that can be used to deliver iodine to all human easily, promotion of its use is very important. For any population to start appreciating the use of iodated salt they need to have a good understanding of the need to do so. On average, about 70% of people used iodated salt, however this is lower in Kaputa. If families are not motivated to use iodated salt it means all other family members would not have access to it. Health education is very helpful especially targeting those who buy salt for the home and those who are mostly likely to be sent.

At household level the time at which salt is added to the food during preparations provides an idea as to whether the iodine would still be available on the table before serving. Salt added at the beginning of cooking especially in foods which cook longer such as beans and meat is likely to lose its iodine. People preparing food need to be sensitised on this issue. This study has reviewed that the majority of people in both districts add salt too early during cooking.

The processing method being used during the processing of salt determines whether iodine will be retained or not. Unlike the salt in Kasempa, the Kaputa salt is reported to have some iodine in it. However, this iodine is likely to be lost due to the heat the salt is exposed to during processing (boiling the filtrate and sun drying).

Legislation

A knowledge of what producers and trader are required of in terms of government regulations is an important thing to bring change in the type salt produced and sold. In this study both groups were well knowledgeable on the S.I. but in Kaputa few people thought this applied to them. Adequate knowledge of the S.I. would have influenced their decisions on what type of salt to sell.

Salt Iodation

Salt iodation has only been accepted by half of the miners. The other half have not yet started iodating the salt especially in Kaputa where only 34% do iodate salt. This could have been due to weak law enforcement system and low level of knowledge on effects of IDD.

Knowledge on IDDs

A good knowledge on IDD provides a good chance of people buying, using and selling iodated salt. All the people involved (producers, traders and consumers) need to have a good knowledge on IDDs. Nearly all the people were aware of the need of iodating salt but in Kaputa awareness is not so much among consumers. This was also reported in the 1999 report on status of local salt iodation program by P. N Likwasi et al. This can be proved by only a few of the consumers being able to give some benefits and most of them still add salt at the beginning of cooking. Poor awareness could have also contributed to only few miners iodating the salt and even traders not minding what type of salt they sold.

Co-operatives

The miners need to be linked to a market in order to sell most of the salt. Cooperatives are some of the other ways in which this can be achieved. Cooperatives are an important way of motivating the miners to produce more salt, improve the quality and iodate it and increase their market share. No active cooperatives exist in both areas to stimulate this. The farmers association in Kaputa is more inclined to agricultural related issues, though some miners are members.

The above highlighted findings are mostly likely to reduce iodine accessibility by most individuals in the two areas. It will take a well organized IEC programme to rise the awareness and to change attitude among people.

The activities in Kaputa seem to be lagging because people believe too much in witchcraft which brings poor team work in the community. Iodation programme also started later than in Kasempa. The number of people involved in salt is larger in Kaputa. District staff are expected to cover more than ten salt mines in terms of health education and salt iodation with only two iodation machines.

Study Limitations

Several limitations were encountered during the study as indicated below

- There was limited time to orient the interviewers and hence may have affected the responses collected/recorded.
- There were slight modifications of the questionnaires after the Kasempa ones were administered and hence cross tabulations between districts were not possible in some instances.
- There has been no quantitative baseline data for the two districts therefore, comparison with the past 3 years was impossible.

10.0 Recommendations

10.1 Producers

- There is need to find a way of taking the equipment (aluminium pots, aluminium dishes, packaging plastic bags, wheel barrows and many others) that are required near to the miners.
- There is need for intensive education programe on the salt storage and importance of the good packaging material. IDD's in general should also be covered. This is more important in Kaputa where very few people know why IDD's should be eliminated and still use more of ordinary bags.
- Miners in Kaputa especially need to be trained in improvement of quality of salt. Very few if any use modern equipment. The remaining few in Kasempa also need training.
- On average, information on legislation is known by a lot of people, however, there is need for intensive education on this in Kaputa.
- Strategies should be developed to encourage cooperative formation in the two areas and linking them to markets where their salt can be sold

10.2 Consumers

- Intensive awareness must be carried out emphasizing on importance of buying and using iodated salt and how iodine in salt can be retained. IEC materials should also be produced to this level.

10.3 Traders

- IDD's causes and prevention especially in Kaputa
- Health education in the following areas;
 - Importance of proper packaging
 - Statutory Instrument

10.4 General Recommendations

- There is need to reorient the machine operators on machine maintenance and addition of potassium iodate to reduce on mistakes made in the past.
- Equipment to be used by iodation machine operators need to be made. A 3 gram spoon should be made to reduce on mistakes. Salt pokers for easy sampling should be acquired.
- There is need to train members of neighbourhood committee as IDD programme promoters and education. This is important for Kaputa especially due to vast number of salt miners scattered in more than ten salt pans. The DHMT alone can not cater for all these miners and mining areas.
- The machines operators and those to be trained as health educators need to have bicycles to cut down on long distances they would have to cover from one mining area to another and from one village to another.
- IDD T-shirts can be a way of motivating the IDD educators and for health education. IEC materials need to be produced for DHMT and other members involved to use.
- It was suggested that the Kaputa DHMT need to come up with a deliberate plan on testing salt which is not yet iodated. This should involve testing for iodine starting with the soil and grass where salt is gotten from, to the filtrate, heated salt, dried salt and finally salt kept for 1 to 2 months. This will help us to conclude if much iodine is found in Kaputa salt, where it is lost in the preparation process and what measures can be put in place to retain it.
- There was also a suggestion that, the next mining season (June-November 2002) all salt miners should be given forms in which they will be filling in the amount of salt they will produce per week. This will help know the amount of salt being produced by each miner and finally approximate amount of salt being produced per district.
- Due to the vastness of the salt pans, it is recommended that more iodation machines be made available to the communities to ease the process of iodation and to reduce on the distances that need to be covered. Kaputa particularly has more salt pans and salt miners and therefore need more machines
- Health inspectors should now try to enforce the legislation on salt. This will encourage the miners iodate their salt. Without enforcement, efforts on iodation would be futile.
- There need for strict supervision of machine operators to ensure that correct amounts of iodine are added.

11.0 Conclusion

Of the two districts, despite all awareness carried, the findings in Kaputa indicate that the program requires improvement. Awareness in terms of IDD is quite low, that is, below 50% of people had the knowledge on IDD and importance of iodated salt.

There are possibilities that salt miners in Kaputa do not consume iodated salt because none of them appreciate iodated salt for home consumption. It is even more worrying that 43% of salt is still not iodated. The two factors increase the risk of iodine deficiency disorders.

Ordinary bags are still very much preferred in terms of packaging materials by producers. This needs to be addressed gently.

In general, Kasempa seems to be more informed about the iodation program because more people so know that both types of salt has iodine added to it.

From both the producers and the consumers, the main source of information remain the community meetings and health workers

Although work has been going on for the past four years in the two districts, a lot more work need to be done to make the program more effective.

Appendixes

Appendix 1: Salt Iodation Figures Between 1998-2001

1.1 Kaputa

Table 1: Salt Iodation Records for Kaputa District

Month	Number of People Iodating Salt	Amount of Salt Iodated (kg)	Amount Of Potassium Iodate Used (g)	Number of teaspoons used
July 1999	183	8,295	1,459	414
August	61	3,240	486	162
September	63	3,980	597	154
December	36	1,000	200	
Total	343	16,515	2,742	730
January 2000	79	2,300	460	56
February	23	640	128	64
March	20	540	108	54
April	21	600	120	60
May	24	660	132	66
June	21	520	104	52
July	61	3,400	554	214
August	119	4,911	768	280
September	108	4,720	741	279
October	31	760	152	76
November	266	7,970	1,568	779
December	-	-	-	-
Total	773	27,021	4,835	1,980
April 2001	40	975	194	-
May	-	-	-	-
June	45	1,090	216	108
July	205	4,856	972	486
August	141	3,210	642	321
September	205	7,155	1,259	542
October	100	5,690	848	311
Total	736	22,976	4,131	1,768
Grand Total	1,852	66,512	11,708	4,4478

Table 2: Kaputa West

Month (1999)	Number of People Iodating Salt	Amount of Salt Iodated (kg)	Amount of Potassium Iodated used (g)	Number of teaspoons used
July	183	8,295	1,459	414
August	61	3,240	486	162
September	63	3,980	597	154
Total	307	15,515	2,542	730
Month (2000)	Number of People Iodating Salt	Amount of Salt Iodated (kg)	Amount of Potassium Iodated used (g)	Number of teaspoons used
July	31	2,520	378	126
August	93	4,191	624	208
September	85	4,060	609	203
October	-	-	-	-
November	8	200	30	10
Total	217	10,971	1,641	547
Month (2001)	Number of People Iodating Salt	Amount of Salt Iodated (kg)	Amount of Potassium Iodated used (g)	Number of teaspoons used
September	62	3,500	525	175
October	64	4,840	678	226
Total	126	8,340	1,203	401

Table 3: Kaputa East

Month (1999)	Number of People Iodating Salt	Amount of Salt Iodated (kg)	Amount of Potassium Iodate used (g)	Number of teaspoons used
December (1999)	36	1000	200	
January (2000)	79	2,300	460	56
February	23	640	128	64
March	20	540	108	54
April	21	600	120	60
May	24	660	132	66
June	21	520	104	52
July	30	880	176	88
August	26	720	144	72
September	23	660	132	66
October	31	760	152	76

November	258	7,770	1,538	769
Total	556	16,050	3,194	1,423
April (2001)	40	975	194	-
May	-	-	-	-
June	45	1,090	216	108
July	205	4,856	972	486
August	141	3,210	642	321
September	143	3,655	734	367
October	36	850	170	85
Total	610	14,636	2,928	1,367

1.2 Kasempa

Table 1: Salt Iodation Records for Kasempa district

MONTH/YEAR	NUMBER OF PEOPLE	AMOUNT OF SALT IODATED KG	NO. OF TSP USED
1998			
September	14	300	45
October	3	80	12
November	4	100	5
December	7	180	9
Total	28	660	72
January 1999	2	100	5
February	1	20	1
March	5	140	7
April	30	1460	73
May	3	60	3
June	-	-	-
July	14	660	33
August	31	1300	65
September	70	2500	125
October	56	1840	92
November	30	1620	81
December	15	480	24
Total	257	10180	509
January 2000	6	240	12
February	2	120	6
March	-	-	-
April	-	-	-
May	-	-	-
June	2	80	4
July	6	260	13
August	17	500	25
September	88	2800	140
October	41	1200	60
November	6	120	6
December	-	-	-
Total	168	5320	266
January 2001	213	6980	340
February	2	60	3
March	10	420	21
April	47	1820	91
May	23	1020	51
June 19 th	24	920	46
Total	319	11220	561
Grand Total	772	27380	1408

Table 2: SANSANYA VILLAGE

MONTH/YEAR	NUMBER OF PEOPLE	AMOUNT OF SALT IODATED KG	NO. OF TSP USED
1998			
September	4	300	45
October	3	80	12
November	4	100	5
December	7	180	9
Total	28	660	72
January 1999	Nil	Nil	Nil
February	1	20	1
March	3	60	3
April	4	80	4
May	3	60	3
June			
July			
August			
September	35	700kg	35
October	34	820	41
November	8	180	9
December			
Total	88	1920	96
January 2000			
February			
March			
April			
May			
June	1	40	2
July	10	240	12
August	41	1040	52
September	8	220	11
October	6	120	6
November			
December			
Total	66	1660	83
January 2001	4	80	4
February	2	60	3
March	6	140	7
April	10	220	11
May	3	80	4
June	6	220	11
Total	31	800	40

Table 3: MUSHINGE

MONTH/YEAR	NUMBER OF PEOPLE	AMOUNT OF SALT IODATED KG	NO. OF TSP USED
January 1999	2	-	-
February	-	80	4
March	2	1380	69
April	26	-	-
May	-	-	-
June	-		
July	14	660	33
August	31	1300	65
September	35	1800	90
October	22	1020	51
November	22	1440	72
December	15	480	24
Total	169	8260	413
January 2000	6	240	12
February	2	120	6
March			
April			
May			
June	2	80	4
July	5	220	11
August	7	260	13
September	47	1760	88
October	33	980	49
November			
December			
Total	102	3660	183
January 2001	209	6900	345
February			
March	4	280	14
April	37	1600	80
May	20	940	47
June 18 th	18	700	35
Total	288	10,420	521

Appendix II: Mini Laboratory - Determination for Potassium Iodate

Table 1: Mini Laboratory Records for Kaputa for the Year 2001

Date	Sample Number	Type of Salt	Source	Results (PPM)
15-03-2001	1	Coarse	Vender (Market)	14.2
	2	Coarse	Vender (Market)	14.2
	3	Fine	Retail Shop (Market)	128.3
	4	C	Machine (Rural Reconstruction)	328.02
	5	C	Household " "	135.48
	6	C	Household (Kabwe)	2078.68
	7	C	" "	00
16-03-2001	8	C	Household Mutambo Kabwe	114.1
	9	C	" (Kabwe)	21.39
	10	C	" (Kabwe)	7.1
20-03-2001	11	C	Household (Kabwe Mine)	14.3
	12	C	" "	7.1
	13	C	" "	00
	14	C	" "	00
05-04-2001	15	Fine	Retail Shop (Noble)	128
	16	Fine	Retail Shop (Chichechelebwe)	127
17-06-2001	17	C	Hospital Kitchen	78.441
04-07-2001	18	-Filtrate from salt miner	-Salt miner	78.45
	19	-Fresh salt	-Salt miner	
19-07-2001	21	C	Market	1,169.48
	22	C	Market	374.37
	23	C	Miner	39
	24	C	H.H. (Rural Reconstruction)	456.38
01-08-2001	26	C	H/H (Rural Construction)	6
	27	F	Market	136
	28	C	Market	80
	29	C	Muchensa	0
	30	C	Kalaba	0
15-10-2001	31	C	Shikayamba	35.66
	32	C	Kabwe	42.78
	33	C	Chiponga	213.9
	34	C	Machine	1069.65
	35	C	Kasongole	49.91
	36	C	Kawama	71.31
24-10-2001	37	C	Chikayamba (immediately after cooking)	10.6
	38	C	" "	0
	39	C	Chikayamba " "	149.75
	40	C	" " Chichechelebwe (packed bags) Chichechelebwe " "	213.93

3. If yes, What are the major Production constraints you face?
- 1) Equipment (specify)
 - 2) Raw materials
 - 3) Others (specify)
4. How do you think salt production can be improved in this area?
- 1) Making available raw materials
 - 2) Strengthening cooperatives
 - 3) Having easy access to equipment
 - 4) Other specify
5. How do you think you can improve on production?

6. Which salt do you iodate once you produce?
- 1) All
 - 2) None
 - 3) Only for sale
 - 4) For home consumption?

7. Please give reasons for your answer

8. How do you package your salt once iodated?
- 1) In Traditional packs
 - 2) In polyethylene bags
 - 3) In jute sacks
9. What method do you think is the best way of packaging your salt?
- 1) In traditional packs
 - 2) In polyethylene bags
 - 3) In jute sacks

Please give reason for your answer

Salt Quality

10. How is the quality of salt you produce?
- 1.) Poor
 - 2.) Good

11. Explain your answer

12. What do think could be done to improve the quality of salt

13. Have you been trained in ways of improving the quality of your salt?
1) Yes
2) No >>>>>go to 17
14. If trained, have you tried the new method of production?
1) Yes
2) No >>>>>go to 16
15. If yes, have you seen any improvements in the quality of your salt since you were trained?
1) Yes
2) No
3) Don't know
16. If no to question 14, Please give reason (s)
1) Process not clear
2) lack of equipment
3) Time consuming
4) Used to old procedure
5) Others
17. Are you aware of the government regulations on salt and its contents?
1) Yes
2) 2) No >>>>>go to 20
- If yes, please mention some of the requirements
- 1)
2)
3)
18. Do you think these regulations apply to you here as well?
1) Yes
2) No
3) Don't know
19. If no to 18, What are some of the limitations that hinder you from observing the government regulation
1) Not aware of it
2) Don't have equipment
3) Others (specify)
20. Do you belong to a cooperative for salt producers?
1) Yes
2) No
3) Not aware of it
21. If yes, what have you done so far as a cooperative?
-

22. Do you sell salt through the cooperatives?
1) yes
2) No

23. If yes, How much salt has been sold through the cooperative?
1) < 20kg
2) 20-50 kg
3) 61-100 kg
4) >100 kg

Storage

24. How do you store the salt?

For Sale:

1) On elevated platform
2) On the ground
3) Other specify

25. For consumption:

1) Air tight container
2) Open container
3) Plastic
4) Traditional pack
5) Other

Checked by _____

3.2 Questionnaire for Salt Consumers

Identification No _____ Interviewer's Name _____

Background information

District: 1) Kasempa 2) Kaputa

Sex 1) Male 2) Female

Marital Status

- 1) Married
- 2) Divorced
- 3) Widowed
- 4) Single

Educational Background

- 1) No formal Education
- 2) Lower primary
- 3) Upper Primary
- 4) Junior Secondary
- 5) Senior Secondary
- 6) Above senior Secondary

Age of Respondent

- 1) 15-20 years
- 2) 21-30 years
- 3) 31-40 years
- 4) 41-50 years
- 5) >50 years

Salt Consumption /Use

1. What type of salt do you usually buy?

- 1) Locally produced
- 2) Imported
- 3) Both types

Please give reason for your choice

.....

2. Have you heard of iodated salt?

- 1) Yes
- 2) No>>>>>>go to 5

3. If yes, where did you hear about it?

- 1) Community meetings
- 2) Health workers
- 3) Radio
- 4) Clinic
- 5) Neighbour/ friend
- 6) Others...

4. Do you buy iodated salt for use in your household?

- 1) Yes
- 2) No
- 3) Don't know

5. Do you know of any health benefits of using iodated salt?

- 1) Yes
- 2) No

6. If yes, what are some of the health benefits of using iodated salt?

- 1) Prevent goiters
- 2) Improved health
- 3) Don't Know
- 4) Any other (specify)

7. At what point during your cooking do you add (iodated) salt?

- 1.) At beginning
- 2.) Half way through
- 3.) Towards end
- 4.) At table

8. Give reason for your answer
...

9. How do you store your household salt?

- 1) Air tight container
- 2) Open container
- 3) Plastic
- 4) Other

Knowledge on IDD

10. Do you see people with swellings in the neck?

- 1) Yes
- 2) No

11. What do you think causes the swellings?

- 5) No iodine in local salt
- 6) Witchcraft
- 7) Heredity
- 8) Don't Know
- 9) Others Specify

12. How can we prevent goitres?

- 1) Treatment
- 2) Use iodated salt
- 3) Other _____

13. Where did you get this information?

- 1) Community meetings
- 2) Health workers
- 3) Radio
- 4) Clinic
- 5) Neighbour/ friend
- 6) Others...

COMMENTS:

3.3 Questionnaire for Salt Traders

Identification No _____ Interviewer's Name _____

Background Information

District: 1) Kasempa 2) Kaputa

Sex 1) Male 2) Female

Marital Status

- 1) Married
- 2) Divorced
- 3) Widowed
- 4) Single

Educational Background

- 1) No formal Education
- 2) Lower primary
- 3) Upper Primary
- 4) Junior Secondary
- 5) Senior Secondary
- 6) Above senior Secondary

Age of Respondent

- 1) 15- 20 years
- 2) 21-30 years
- 3) 31-40 years
- 4) 41-50 years
- 5) > 50 years

1. Do you sell local salt?
1) Yes
2) No >>>>>go to 3

2. If yes, how do you sell it?
1) In plastic Bags
2) Using scoops
3) In traditional packs

3. If no, give reasons
1) Poor Quality
2) Packaging not good
3) Not iodated
4) Other

4. What conditions should the local salt meet if it has to attract consumers?
1) Improve the quality (colour)
2) Reduce amount of moisture
3) Improve packages
4) Other

5. Are you aware of any statutory instrument on salt?

- 1) Yes
- 2) No

6. If yes Mention some of the provisions

- 1) Salt iodation
- 2) Labelling
- 3) Quality standards
- 4) Not sure
- 5) Other

Knowledge on IDD

7. Do you see people with swellings in the neck?

- 1) Yes
- 2) No

8. What do you think causes the swellings?

- 1) No iodine in local salt
- 2) Witchcraft
- 3) Heredity
- 4) Don't know
- 5) Others Specify

9. How can we prevent goitres?

- 1) Correct answer
- 2) Wrong answer
- 3) Don't know

Appendix VI: List of Enumerators.

1.	MS Hildah Sitenge	-	Kasempa Basic School
2.	Mr Friday Chungu	-	Kasempa Basic School
3.	Mr rodias Mukoma	-	Kasempa Basic School
4.	Mr Arnold Mumena	-	Kasempa Boys School
5.	Ms Judy Mulenga	-	Kasempa Basic School
6.	Ms Roida Kawanga	-	Day School
7.	Mr Mutale Pensteven	-	Kaputa
8.	Mr Rabon Chola	-	Farmers Association
9.	Ms Crillian Mambwe	-	Teacher
10.	Mr Himayumbula Chali B	-	Teacher
11.	Mukuka Chanda R		
12.	Ms Jevis Katandula	-	
13.	Mr Richard Kondolo	-	Senior Teacher
14.	Ms Getrude Chipalo	-	Teacher
15.	Charles chekwe	-	Health Inspector DHMT
16.	Mr Stanely Mweene	-	DHMT

Appendix VII: Kaputa Salt Pans

- Chibwebwe
- Chimbilimbili
- Mowa
- Chichechelebwe
- Shikayamba
- Kapisha
- Sipolo
- Chiponga
- Chilombwa
- Kabwe
- Lukalanga/Kapili Waibeya
- Bondo
- Munsongo

My doc:iddevalureport5