EXECUTIVE SUMMARY

Several attempts have been made in the past 15 years to obtain some information on the status of IDD in The Gambia. These previous attempts, despite their inaccuracies, pointed to the presence of IDD in The Gambia. This present study was again another attempt by the Nutrition Unit of the Department of State for Health with the assistance of the World Health Organisation and funded by the PHPNP.

In the survey design, 30 schools were randomly selected from the 5 administrative divisions of the country with Banjul and Kanifing representing the urban population. In each school, 100 pupils were palpated for goitre. On the whole 3000 pupils aged between 8-12 years were examined. Urine sample was collected from every 5th child, thus 600 urine samples were collected for the measurement of urinary iodine. All the children examined were requested to come to school with a pinch of salt from their homes to be tested for iodine and from the schools and communities (markets) 607 (six hundred and seven) salt samples were tested.

In the measurement of total goitre rate, Banjul, Kanifing Municipality, Western and North Bank divisions were aggregatively less than 3%. According to WHO classification IDD is not a public health problem in these areas. In the other divisions goitre rates are as follows:- Lower River Division (12.4%), Central River Division (17.4%), and Upper River Division (19.3%). Based on these data, the goitre rate for these endemic areas and indeed for The Gambia is 16.3%.

The data that have been analysed also shows that 54 out of 607 salt samples tested for iodine were positive. This indicates that only 9% of the salt circulating in The Gambia is adequately iodised. All the salts tested in Banjul and Kanifing Municipality tested negative with the exception of only 4%, i.e. 96% of the salt in this area is non-iodised.

The median urinary iodine measurement gives the true reflection of the level of endemicity in the country and has been used to validate the preliminary result based on total goitre rate. Results from the 600 urine samples sent to South Africa for analysis indicate an average median urinary iodine level for the country of 4.18ug/dl. This classifies the country as having moderate iodine deficiency disorder.

The key recommendations are as follows:-

- Urgent adoption of the ECOWAS framework on Universal Salt Iodisation (USI)

- Parliamentary legislation of salt iodisation in the Gambia/or Ministerial Directive on the importation of salt into the Gambia.

- Strong advocacy to the Management of the Salt Industry in Senegal on the need to bring in only iodised salt into Gambia.

- Request UNICEF to supply small-scale iodination plants to local salt producers.

- IEC on the consequences of IDD and promotion of Iodised salt.

- Training of Regulatory Agencies and Health workers on routine monitoring of iodised salt in households, markets, shops and ports of entry into The Gambia.

- Another short consultancy in 2000 in order to guide the government through the realisation of set goals.

I deeply thank the Nutrition Unit for allowing me to serve the people of The Gambia. Particular appreciation to Mrs Isatou Janneh, Mr. Phall, and my friend Mr. Amat Bah. I am grateful to the WHO and the ICC IDD for using me as their consultant.

Dr. John O. Egbuta
WHO Consultant
17th December 1999

Picture 1: The consultant demonstrating an enlarged thyroid on a schoolgirl during the training of the field investigators.

INTRODUCTION

Iodine is a vital component of thyroid hormones and a prerequisite for normal growth and development in animals and man. Thyroid hormones are essential for normal brain development and the control of organ functions. It occurs in the human body in only small amounts (15-20mg) and the essential requirement for normal growth is only 100-150ug per day (0.1-0.15 mg). When the daily iodine intake drops below 150 ug goitre, hypothyroidism and ultimately cretinism will occur. The iodine available in the diet depends on the iodine content of the soil and water. Dietary iodine is absorbed in the gut, trapped in the thyroid gland, organified to tyrosine residues of thyroglobulin forming both monoiodotyrosine (MIT) and di-iodotyrosine (DIT) residues. Coupling of MIT and DIT yields tri-iodotyronine(T3) and tetra-iodotyronine(T4). T4 is the major form of thyroid hormone secreted and its production is under a negative feedback regulation from the pituitary thyroid stimulating hormone (TSH) (1).

The thyroid hormones are degraded mainly in the liver, the iodine released, recycled and finally excreted in urine. The thyroid hormones are ubiquitous in their activity and they can influence the growth and maturation of all tissues, turnover of all substrates, vitamins, hormones and energy generation and expenditure (2).

Iodine deficiency causes low production and low blood levels of T4 leading to a feedback increase in TSH secretion. Prolonged deficiency elicits prolonged stimulation of the thyroid gland by TSH. This leads to the compensatory hyperplasia and ultimate enlargement of the gland (goitre). The size of the goitre will depend on the severity of the deficiency. Another compensatory mechanism engaged by the gland is increased avidity for and turnover of iodine. When the compensatory mechanism fails, hypothyroidism results.

The lack of thyroid hormones produces sluggishness and in the worst scenario, mental and physical retardation. In most new-borns the damage of the brain and the nervous system due to iodine lack cannot be corrected; this condition is called cretinism which is one of the most dramatic consequences of iodine lack in the body. In women, iodine deficiency causes reproductive failure and complications during pregnancy. Iodine deficiency retards socio-economic development, since the affected individuals are less productive and more handicapped individuals had to be taken care of. IDD is the commonest cause of preventable impairment of intellectual and mental development and function.

World wide, about 1,572 million people are at risk of IDD and an estimated 655 million suffer from IDD of which 43 million have brain damage (3). In Africa, about 181 million people are at risk of IDD of which 6 million suffer intellectual and mental handicap; and 2 million are cretins. IDD is thought to contribute substantially to the continued under development of Africa and other third world countries.

SURVEY OF IDD IN THE GAMBIA

Objective of the Study:

Several attempts have been made in the past 15 years to obtain some information on the status of IDD in the Gambia. The first study was conducted by two unsupervised London University students in 1984 (4) which reported goitre rates of 30% and 15% respectively. This study lacked scientific merit because the grading of the goitre was not well described in the students unpublished report. The second study was carried out by Professor Ekpechi in 1993 and sponsored by the WHO (5). The study was inconclusive. In the absence of a reliable survey data, Gambia is suspected of having mild to moderate IDD problem if the available data from its immediate neighbouring countries is any thing to go by. The two previous studies mentioned earlier, despite their inaccuracies, point at a possible existence of mild to moderate IDD in The Gambia. At the recently concluded West African Regional conference on IDD held in Abuja, Nigeria there was sufficient report on IDD from other Anglophone countries with the exception of Gambia (6). The Department of State for Health and Social Welfare has recognised the need for a bench-mark survey on iodine deficiency disorders and therefore sought the assistance of the WHO and the World Bank's Participatory Health, Population and Nutrition Project (PHPNP) in conducting the first reliable IDD survey in school children aged between 8-12 years. A rapid review of the iodised salt situation including salt distribution, source of supply, household consumption, and local salt production are to be investigated.

The final objective was to build a critical mass of competent health workers in the DoSH who could organise and carry out surveys on IDD on their own with or without an input from an external consultant. To this end, the first 4 days of this consultancy was devoted for training of the health workers on how to palpate goitre, method of testing for iodised salt in the field, correct collection of urine samples and labelling. The result in the field was commendable. It was however established from the onset that, in line with ICCIDD guidelines, greater reliance would be on the outcome of the result of the urinary iodine excretion assay rather than by goitre palpation, which by design was merely to validate the outcome of the urine analysis.

SAMPLE DESIGN AND METHODOLOGY

In close consultation with the Nutrition Unit of DoSH and adopting internationally accepted guidelines the following frame was adopted"

- Palpation for goitre was to be done on school children aged between 8-12 years.
- The survey was to be conducted in all the five administrative divisions in the Gambia and the schools within these divisions were to be randomly selected using a statistically accepted formula. Banjul and Kanifing were included in this survey to represent the urban areas.
- Five schools were randomly selected and surveyed in each division giving a total of 6 divisions x 5 schools = 30 schools.

- 100 pupils were randomly selected (simple random selection) from each school and examined for goitre. A total of 3000 (three thousand) pupils were examined.
- Every 5th child examined was requested by the team to produce about 5 mls of urine, which will be assayed for urine iodine. A total 600 urine samples were collected and sent to a laboratory in South Africa for analysis.
- Some of the pupils were requested during the schools sensitisation to bring along a pinch of salt from their homes to be tested for the presence of iodine.
- In all about 600 salt samples were collected from the schools and from the communities and tested in the field using the field test kit.
- Formats for entering results of palpation and salt testing were produced and distributed to the teams before moving to the field.

Urine samples collected in the field were safely stored in the cold rooms located in the divisional health offices before they were moved to Banjul for onward despatch to South Africa. Each box had a sachet of ice pack in it before their transportation.

IDD is perceived to be a bigger problem in the Eastern half of The Gambia than the West and in order to have a representative survey, 21 out of the 30 schools to be covered were randomly selected from the East. Thus, there was a further adjustment in the survey design such that Banjul and Kanifing, Western, and North Bank divisions had 3 schools in them surveyed instead of 5.
The following (table 1) is a list of the divisions and the schools selected for the survey.

TABLE 1.:
RANDOMLY SELECTED SCHOOLS FOR THE NATIONAL IODINE DEFICIENCY DISORDER (IDD) SURVEY FROM 30TH NOVEMBER TO 17TH DECEMBER 1999.

BANJUL/KANIFING:
1. St. Mary's School
2. St. Charles Lwanga
3. Methodist School

WESTERN DIVISION:
1. St. John's (Bulock)
2. Kassa Kunda
3. St. Martin's (Kartong)

NORTH BANK DIVISION:
1. Saaba
2. Kerr Ndongo
3. Duntumalang

LOWER RIVER DIVISION:
1. Sukuta
2. Kwinella

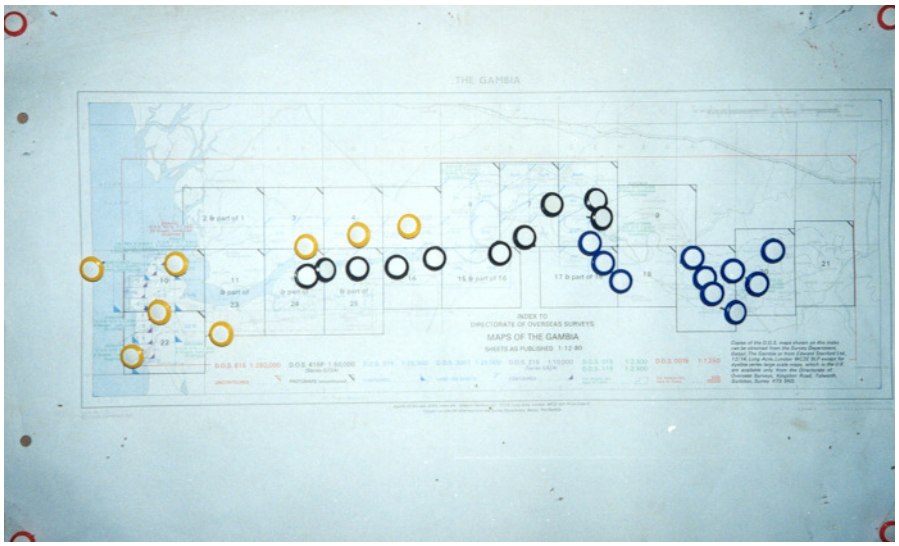
3. Karantaba
4. Barrow Kunda
5. Soma
6. Jiroff
7. Burong

CENTRAL RIVER DIVISION:

1. Kudang
2. Kuntaur
3. Kayai
4. Boraba
5. Mbaien
6. St. Therese's (Fullabantang)
7. Boiram

UPPER RIVER DIVISION:

1. Diabugu
2. Kossemar
3. Sare Gubu
4. Touba Woopa
5. Baro Kunda
6. Sotuma Sere
7. Nyakoi



Picture 2. Distribution of selected schools across the country

TABLE 2.:

SCHOOLS AND CODES FOR THE SPECIMEN TUBES FOR THE NATIONAL IODINE DEFICIENFCY DISORDER (IDD) SURVEY FROM 30TH NOVEMBER TO 17TH DECEMBER, 1999.

SCHOOL (BANJUL/KANIFING):	LABELLING ON TUBE:
St. Mary's School	BK - 01 - 01 to 20
St. Charles Lwanga	BK - 02 - 01 to 20
Methodist School	BK - 03 - 01 to 20
SCHOOL (WESTERN DIVISION):	
St. John's (Bulock)	WD - 01 - 01 to 20
Kassa Kunda	WD - 02 - 01 to 20
St. Martin's (Kartong)	WD - 03 - 01 to 20
SCHOOL (NORTH BANK DIVISION):	
Saaba	NBD - 01 - 01 to 20
Kerr Ndongo	NBD - 02 - 01 to 20
Duntumalang	NBD - 03 - 01 to 20
SCHOOL (LOWER RIVER DIVISION):	
Sukuta	LRD - 01 - 01 to 20
Kwinella	LRD - 02 - 01 to 20
Karantaba	LRD - 03 - 01 to 20
Barrow Kunda	LRD - 04 - 01 to 20
Soma	LRD - 05 - 01 to 20
Jiroff	LRD - 06 - 01 to 20
Burong	LRD - 07 - 01 to 20
SCHOOL (CENTRAL RIVER DIVISION):	
Kudang	CRD - 01 - 01 to 20
Kuntaur	CRD - 02 - 01 to 20
Kayai	CRD - 03 - 01 to 20
Boraba	CRD - 04 - 01 to 20
Mbaien	CRD - 05 - 01 to 20
St. Therese's (Fullabantang)	CRD - 06 - 01 to 20
Boiram	CRD - 07 - 01 to 20
SCHOOL (UPPER RIVER DIVISION):	
Diabugu	URD - 01 - 01 to 20
Kossemar	URD - 02 - 01 to 20
Sare Gubu	URD - 03 - 01 to 20
Touba Woopa	URD - 04 - 01 to 20
Baro Kunda	URD - 05 - 01 to 20
Sotuma Sere	URD - 06 - 01 to 20
Nyakoi	URD - 07 - 01 to 20

DETECTION AND MEASUREMENT OF IDD:

Casual observation of goitres, remoteness and geographical features may signal the presence of significant iodine deficiency. Goitre is usually the most obvious sign of iodine deficiency. Goitre surveys and measurement of urinary iodine among others are frequently employed (8).

Goitre survey:

The thyroid size can be determined by palpation, inspection and by ultrasonography. Goitres are graded as follows (9):

Grade 0: no palpable goitre
Grade 1: palpable goitre but not visible with the neck in the neutral position.
Grade 2: visible goitre with neck in the neutral position. Goitre begins to appear when the daily iodine consumption falls below 50ug. A goitre rate of 5% or more in school children aged 8-12 years usually indicates iodine deficiency of public health importance (10). In this present survey 3010 school children aged between 8-12 years were examined for the presence of goitre both by casual examination and palpation.

Urinary Excretion of Iodine (UEI):

Measurement of the quantity of iodine excreted in the urine provides a good index of intake since almost all body iodine is eventually lost in the urine. UEI less than 50ug/day means iodine deficiency. Twenty four-hour urine collections are almost impossible in the field and casual urine samples are used. Previously, the iodine content was related to the creatinine content of the same urine sample (11), but this has been found misleading in malnourished communities with low creatinine excretion (12). The recommendation by Boudoux et al(12) that UEI be expressed in ug/dl is simpler, more reliable and has been adopted universally. This was the adopted method in this current study.

Measurement of T4, T3 and TSH:

These tests are more expensive and less easily available and for this study were not used.

Iodine Deficiency Disorder (IDD) Severity And Classification By WHO Standards:

	Prevalence of goitre (TGR)
Mild IDD	5 – 19.9 %
Moderate IDD	20 – 29.9%
Severe IDD	>30%

Urinary Iodine Levels And IDD Severity:

No IDD	>10ug/dl (100ug/l)
Mild IDD	5.0 – 9.99ug/dl
Moderate IDD	2.0 – 4.99ug/dl
Severe IDD	<2.0ug/dl

RESULTS:

Total Goitre Rates (TGR):
The following tables illustrate the prevalence of goitre among the 3010 (three thousand and ten) school aged children sampled.

TABLE 3:
SUMMARY OF GOITRE PREVALENCE AMONG 7 RANDOMLY SELECTED SCHOOL AGED CHILDREN 8 – 12 YEARS IN URD.

Division	School	Male	Female	Grade 0	Grade 1	Grade 2
URD	Diabugu	60	40	86	13	1
	Sare Gubu	45	55	86	14	0
	Tuba Wopa	65	35	74	25	1
	BaroKunda	62	38	82	18	0
	Nyakoi	58	42	85	14	1
	Sotuma Sere	61	39	76	22	2
	Kosemar	49	51	76	24	0
TOTAL	**7 Schools**	**400(57.1%)**	**300(42.9%)**	**565(80.7%)**	**130(18.6%)**	**5(0.7%)**

TABLE 4:
SUMMARY OF GOITRE PREVALENCE AMONG 7 RANDOMLY SELECTED SCHOOL AGED CHILDREN 8 – 12 YEARS IN CRD.

Division	School	Male	Female	Grade 0	Grade 1	Grade 2
CRD	Kuntaur	47	54	95	6	0
	Kayai	52	48	92	8	0
	Kudang	55	45	84	16	0
	Boraba	48	52	81	19	0
	Mbaien	55	45	68	26	6
	St Therese's/ Fula Bantang	53	47	78	19	3
	Boiram	36	64	81	19	0
TOTAL		**346(49.4%)**	**355(50.6%)**	**579(82.6%)**	**113(16.1%)**	**9(1.3%)**

TABLE 5:
SUMMARY OF GOITRE PREVALENCE AMONG 7 RANDOMLY SELECTED SCHOOL AGED CHILDREN 8 – 12 YEARS IN LRD

Division	School	Male	Female	Grade 0	Grade 1	Grade 2
LRD	Sukuta	59	42	88	13	0
	Barrow Kunda	55	45	75	25	0
	Jirrof	41	60	93	8	0
	Kwinella	47	53	91	9	0
	Soma	48	52	85	15	0
	Burong	62	38	94	6	0
	Karantaba	71	35	94	12	0
TOTAL	**7 Schools**	**383(54.1%)**	**325(45.9%)**	**620(87.6%)**	**88 (12.4%)**	**0(0.0%)**

TABLE 6:
SUMMARY OF GOITRE PREVALENCE AMONG 9 RANDOMLY SELECTED SCHOOL AGED CHILDREN 8 – 12 YEARS IN BANJUL AND KANIFING

Division	School	Male	Female	Grade 0	Grade 1	Grade 2
Banjul and Kani-fing	St MARY'S	50	50	99	0	1
	METHODIST	45	55	100	0	0
	ST. CHARLES	49	52	100	1	0
TOTAL	**3 Schools**	**144(48.0%)**	**157(52.0%)**	**299(99.3%)**	**1(0.3%)**	**1(0.3%)**

TABLE 7.:
SUMMARY OF GOITRE PREVALENCE AMONG 9 RANDOMLY SELECTED SCHOOL, AGED CHILDREN 8 – 12 YEARS IN WESTERN DIVISION

Division	School	Male	Female	Grade 0	Grade 1	Grade 2
WESTERN DIVISION	St. JOHN'S	55	45	99	0	1
	St. MARTIN'S	49	51	100	0	0
	KASSA KUNDA	48	52	99	1	0
TOTAL	**3 Schools**	**152(50.7%)**	**148(49.3%)**	**298(99.3%)**	**1(0.3%)**	**1(0.3%)**

TABLE 8.:
SUMMARY OF GOITRE PREVALENCE AMONG 9 RANDOMLY SELECTED SCHOOL ,AGED CHILDREN 8 – 12 YEARS IN NORTH BANK DIVISION

Division	School	Male	Female	Grade 0	Grade 1	Grade 2
NORTH BANK DIVISION	KERR NDONGO	46	54	97	1	2
	DUNTU-MALLANG	69	31	98	1	1
	SAABA	56	44	98	1	1
TOTAL	**3 Schools**	**171(57.0%)**	**129(43.0%)**	**293(97.7%)**	**3(1.0%)**	**4(1.3%)**

TABLE 9: PERCENTAGE OF SEXES AND GRADE OF GOITRE BY DIVISION

DIVISION	GRADE ONE			GRADE TWO	
	Male	*Female*		*Male*	*Female*
BJL/KMC	*0.0*	*100.0*		*0.0*	*100.0*
WD	*100.0*	*0.0*		*0.0*	*100.0*
NBD	*50.0*	*50.0*		*40.0*	*60.0*
LRD	*37.5*	*62.5*		*0.0*	*0.0*
CRD	*40.7*	*59.3*		*55.6*	*44.4*
URD	*51.5*	*48.5*		*40.0*	*60.0*
AVERAGE	***44.2***	***55.8***		***42.9***	***57.1***

Urinary Excretion of Iodine (UEI):
The urine samples collected in the field (600 in all) were dispatched to a Laboratory in South Africa for urinary iodine analysis. Urinary iodine measurements are used to confirm rates of visible goitre observed.

The table below (10) shows the median iodine levels for the five administrative divisions, Banjul and Kanifing and also the national average. The levels for the individual schools can be found in appendix 1:

TABLE 10: URINARY IODINE DETERMINATION ON 600 SAMPLES

S/N	Division	No. of Urine sample	Median Urinary level (ug/dl)
1.	Banjul/Kanifing	60	7.37
2.	Western Division	60	3.59
3.	North Bank Division	60	4.75
4.	Lower River Division	135	2.76
5.	Central River Division	149	6.88
6.	Upper River Division	140	3.18
	Community Average		**4.18**
	Total Analysed	594	

Six bottles arrived in South Africa without any urine in them.

Picture 3. Urine collection from a pupil

Tests for iodated salt:
In the field test for Iodine in salt, it was shown that on the average only 9% of households in Gambia consume adequately iodised salt. The breakdown of iodised salt consumption in the various divisions are shown in the table below:-

TABLE 11:
SALT SAMPLES TESTED

	TOTAL	+VE	PERCENTAGE
LRD	112	6	5.3%
CRD	95	22	23%
URD	100	18	18%
BJ+KANIFING	100	4	4%
NORTH BANK	100	4	4%
WESRTERN DIV.	100	0	0
	---	--	---
	607	54	9%
	===	==	==

Only 9% of the salt in the Gambia is iodised.

On further examination of the origin of the non-iodised salt being consumed in the Gambia, it was observed that about 80% of this comes from Senegal. The other 20% is coming from The Gambia and other countries outside of Africa.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS:

This survey has clearly shown areas in The Gambia that can be classified as IDD endemic. The Banjul and Kanifing Municipality by their proximity to the coast are almost totally free of obvious cases of goitre. Of the 900 school children surveyed in Banjul, Kanifing Municipality, Western and the North Bank Divisions only 11 cases of goitre were seen. Showing a prevalence rate of 1.2%. This low total goitre rate can only be due to the access of these communities to sea foods which are very rich in iodine. In the other divisions, the goitre rates were as follows:

LRD = 12.4%
CRD = 17.4%
URD = 19.3%

On simple average the total goitre rate for these endemic areas, and indeed the entire Gambia comes to 16.3%.

This figure classifies the Gambia as a country with mild IDD generally. When this is desegregated further it is observed that about 56% of these are females (Table 9). The lack of access of these inland communities to sea foods as well as the slightly undulating nature of the land should be responsible for the higher level of endemicity. This study did not allow for time to look at the dietary pattern of the communities in order to establish the contribution of goitrogens to the endemicity of IDD.

Urinary iodine levels are used to confirm goitre rates and as seen in table 10, The Gambia has an average median urinary iodine level of 4.18ug/dl which according to WHO does indicate that the country has moderate IDD. It can therefore be concluded that The Gambia has a mild to moderate iodine deficiency disorder.

As can be seen from the results on testing of salt in The Gambia, only 9% of the salt is iodised. It has been observed that the CRD and the URD have higher consumption of iodised salt, 23% and 18% respectively. It was establish in this survey that the salt is coming from neighbouring Senegal. However, the above rates are so small that they may not make a significant difference in the rates of visible goitre.

The surest way to control IDD in any community or country is to embark on Universal Salt Iodisation (USI). To reach USI, 80% of salt consumed in households should be iodised. Among the other recommendations listed below, the Gambian government should very quickly initiate full action leading to the process of USI.

RECOMMENDATIONS

- Urgent adoption of the ECOWAS framework on USI

- Parliamentary legislation of salt iodisation in the Gambia/or Ministerial Directive on the importation of salt into the Gambia.

- Strong advocacy to the Management of the Salt Industry in Senegal on the need to bring in only iodised salt into Gambia.

- Request UNICEF to supply small scale iodation plants to local salt producers.

- IEC on the consequences of IDD and promotion of Iodised salt.

- Training of Regulatory Agencies and Health workers on Routine monitoring of iodised salt in households, markets, shops and Ports of entry into The Gambia.

- Another short consultancy in 2000 in order to guide the government through the realisation of set goals.

Appendix I:

Median urinary iodine levels for individual schools, division and national average.

DIVISION	SCHOOL	ug/dl
BANJUL/ KANIFING	St. Mary's School	8.65
	St. Charcles Lwanga	7.86
	Methodist School	6.43
MEDIAN		**7.37**
WESTERN DIVISION	St. John's (Bulock)	3.53
	Kassa Kunda	3.30
	St. Martin's	5.00
MEDIAN		**3.59**
NORTH BANK DIVISION	Saaba	12.19
	Kerr Ndongo	3.01
	Duntumanlang	5.21
MEDIAN		**4.75**
LOWER RIVER DIVISION	Sukuta	2.77
	Kwinella	3.22
	Karantaba	1.80
	Barrow Kunda	1.82
	Soma	4.03
	Jiroff	3.79
	Burong	1.64
MEDIAN		**2.76**
CENTRAL RIVER DIVISION	Kudang	6.80
	Kuntaur	6.12
	Kayai	4.91
	Boraba	13.48
	Mbaien	3.71
	St. Therese's (Fullanbantang)	7.86
	Boiram	9.36
MEDIAN		**6.88**
UPPER RIVER DIVISION	Diabugu	3.89
	Kossemar	26.76
	Sere Gubu	2.79
	Touba Woopa	1.79
	Baro Kunda	1.23
	Sotuma Sere	3.66
	Nyakoi	3.29
MEDIAN		**3.18**
NATIONAL MEDIAN		**4.18**

URINARY IODINE LEVELS AND IDD SEVERITY

No IDD	>10ug/dl
Mild IDD	5.0 - 9.99ug/dl
Moderate IDD	2.0 - 4.99ug/dl
Severe IDD	<2.0ug/dl

Appendix II:

NATIONAL IODINE DEFICIENCY DISORDER SURVEY
The Gambia - November/December 1999

Division:……………………… **Town/Village**:………………………..

School:………………………..

Grade:	**Description:**
0	No goitre
1	Palpable-larger than the end of the thumb
2	Visible with neck tilted or in normal position

	Sex		Grading of Goitre		
	Male	Female	0	1	2
Total					

Appendix III:

NATIONAL IODINE DEFICIENCY DISORDER SURVEY
The Gambia - November/December 1999

Division:…… **Town/Village**:……..

No.	Colour change: Y/N	Source of sample (eg. H/H/ MKT/SMKT)	Concentration (ppm)	Label on salt bag	Country of export	Remarks (Coarse/fine etc

Officer in charge of testing:…… **Date:……**

Appendix IV:

NATIONAL IODINE DEFICIENCY DISORDER SURVEY

THE SURVEY TEAM

Consultant:
Dr. John Egbuta - ICCIDD Regional Co-ordinator for West Africa

Investigator:
Amat Bah - Nutrition Unit

Supervisors:
Oulaye Taal Njie - Nutrition Unit
Modou C. Phall - Nutrition Unit

Team 1 (Banjul/Kanifing, Western Division and North Bank Division):

Musa Dahaba	Team leader - Nutrition Unit
Ramou Secka	SEN - RVH
Momodou Fatajo	Health Officer - ESU
Sulayman Bah	SEN - LRD
Karafa Ceesay	Driver

Team 2 (Lower River Divisin and *Part of* Central River Division):

Malang N. Fofana	Team leader - Nutrition Unit
Sana Sambou	Health Officer - ESU
Bakanding Fofana	Health Officer - Environment Unit
Kitabou Balajo	SRN/MW - URD
Habib Jeng	Driver

Team 3 (Upper River Division and *Part of* Central River Division):

Alieu Kujabi	Team leader - Nutrition Unit
Yusupha Camara	SRN - RVH
Anthony Mendy	SEN - CRD
Abdoulie Camara	Health Officer - Environment Unit
Abdou Tamba	Driver

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