APPENDICES

APPENDIX I: QUESTIONNAIRE FOR CONDUCTING IDD SURVEY IN GOITRE ENDEMIC DISTRICT IN MAINLAND TANZANIA (1999) AND IN ZANZIBAR (2001)

1. District……Code….. **2**. School …… Code……… **3**. Name of village…… Code……

4. Location of village: 1 = Urban 2 = Urban [ ]

5. Geographical location: Highland =2, Lowlands =3, Township =3 [ ]

6. Class ------ (I-VII) [ ]

7. Date of interview dd/mm/yy [ ][ ] [ ][ ] [ ][ ] **8**. Name of interviewer ……… Signature ………

9. *Child no.*	***10***.*Child Age (complete years)*	***11***. *Sex M = 1 F = 2*	***12***. *Ever heard of iodated salt 1=Yes 2=No*	***13***.*Can you identify iodated salt 1=Yes 2=No*	***14***.*Goitre grade **Old**=0,1a,1b,2, 3. **New**=(0,1, 2)*		***15***.*Salt test for iodine +ve = 1 -ve = 2*	***16***.*Urinary iodine conc. (µg/L)*
					Old	**New**		
[ ][ ]	[ ][ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[ ][ ]	[ ][ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[ ][ ]	[ ][ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
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[ ][ ]	[ ][ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

APPENDIX II: QUESTIONNAIRE FOR SALT TRADERS USED FOR PAPER I&II

1. Region ……

2. District and code number

Zanzibar North	=01	Zanzibar North	= 02	[ ] [ ]
Zanzibar Central	=03	Zanzibar South	= 04	
Zanzibar Town	=05	Zanzibar West	= 06	
Wete-Pemba North	=07	Micheweni-Pemba North	=08	
Chakechake-Pemba	=09	Mkoani-Pemba	= 10	

3. (i) Ward…….. (ii) Village…….…….

4. Location

Urban = 1 Rural = 2 [ ]

5. Geographical features

Highland = 1 Lowland = 2 Township = 3 [ ]

6. Date of interview (dd/mm/yy) [ ][ ] [ ][ ] [ ][ ]

7. How old are you (completed years)?

99= don't know

98= above 90 [ ] [ ]

8. What is the highest formal school you completed?

No education	=1	
Less than 1 year	=2	
Standard 1-4	=3	
Standard 5-8	=4	
Form 1-2	=5	
Form 3-4	=6	
Form 5 -6	=7	
More than secondary school	=8	
Adult Education	=9	[ ]

9. Have you heard of IDD?

Yes = 1 No = 2 [ ]

If No go to Question 12

10. If yes, how did you learn about the IDD?

Posters/Billboards	=	1	
Leaflets	=	2	
Radio	=	3	
Newspapers	=	4	
Others (specify)	=	5	[ ]

11. Have you ever seen a person with Goitre

Yes = 1 No= 2 Not sure= 3 [ ]

12. Have you heard about iodated salt?

Yes = 1 No = 2 Not sure = 3 [ ]

13. How do you identify iodated salt?

1= Iodated salt emblem 3= Test kit

2= Written on the packet/bag 4= Others [ ]

14. Is the salt you are currently selling iodinated?

1 = Yes 2= No 3= Not sure [ ]

15. Did you ever sell salt which is not iodinated?

1= Yes 2=No 3=Not sure [ ]

16. Are you still selling non iodated salt?

1=Yes 2=No 3= Not sure [ ]

17. Why are you currently still selling non iodated salt?

1=Peoples preference 3= Easy to handle

2= Easy to sell 4=Others (specify)

5=Not applicable …… [ ]

18. Why did you stop selling non iodated salt?

1=Legislation 4=Not available

2=Advised by health personnel 5=Others (specify)

3= Not good for health …… [ ]

19. FOR INTERVIEWER ONLY

20 (a) Non iodized salt available in shop?

1= Yes 2=No [ ]

20 (b) Price in Tshs/Kg: i) Fine salt [ ] [ ] [ ] ii) Coarse salt [ ] [ ] [ ]

20 (c) Is iodized salt available in shop?

1=Yes 2= No [ ]

20 (d) Price in Tshs/Kg : i) Fine salt [ ] [ ] [ ] ii) Coarse [ ] [ ] [ ]

APPENDIX III : TANZANIA FOOD AND NUTRITION CENTRE

QUESTIONNAIRE FOR CONDUCTING NATIONAL IDD SURVEY 2003/4

1. District…… 2. Ward ……. 3. School ……

4. Geographical location: Highland = 1 Lowlands = 2 Township = 3 [ ]

5. Name of interviewer …… 6. Date of interview ----------

No.	***Child name***	***Age (years)***	***Sex M = 1 F = 2***	***Class (I-VII)***	***Goitre grade (0,1,2)***	***Salt test for iodine +ve = 1 -ve = 2***	***Urinary iodine (µg/l)***	***Remarks***
1.								
2.								
3.								
4.								
5.								
etc.								

APPENDIX IV: GUIDE QUESTIONNAIRE FOR SALT IODATION MONITORING AT FACTORY LEVEL IN MAINLAND TANZANIA (Paper IV)

Region: _____ District: _____ Name of Factory: _____

Owner: _____ Location: _____

Date of inspection: _____ Name of inspector:_____

1. Mode/mechanism of salt production

- Solar
- Thermal
- Both

2. Mode of iodation

- machine spray
- Hand spray
- Dripping
- Dusting (Dry-mixing).

3. (a) Type of iodation machine (*if Q.2=a)*

- large (16 tons and above per hour)
- medium (5-15 tons per hour)
- small (less than 5 tons per hour)
- others:_____

(b) What is the state of the machine?

- working
- not working

4. Packaging:

(a) Type of material:-

- jute bags
- sisal bags
- polythene bags
- others

(b) Quality of packaging materials

- lined
- not lined
- specially lined material

(c) Type of sealing

- threading
- glue
- tie
- others (specify)_____

(d) Labelling (multiple answers)

(Tick if the item is shown✓)

- address
- batch No.
- IDD logo
- date of production
- date of expiry
- quality specifications (ingredients) :
  - amount of iodine (in ppm) _____
  - % moisture content
  - % impurities

5. Storage:

(a) Exposure to sun

- shaded
- not shaded

(b) If shaded

- walled
- not walled

(c) Type of floor

- earthen
- concrete
- brick
- wooden
- others_____

6. Quality control

(a) Is there a mini-lab?

- Yes
- No

(b) Is there an internal quality control mechanism?

- Yes
- No

(c) If yes, what are the elements?

- spray nozzle checking
- speed checking (conveyer, mixer etc)
- precision in the preparation of KIO_3 solution
- testing of iodine level
    - Qualitative
    - Quantitative

If quantitative testing is done, is standard QC material used?

- Yes
- No

7. Record keeping

(a) Is there record keeping for iodine content?

- Yes
- No

(b) If yes, the iodation levels ranged from----------to --------ppm

8. Mention three major constraints you are facing

(1) _____

(2) _____

(3) _____

9. Three samples collected for testing at TFNC (*Tick* ✓)

- before iodization [ ]
- after iodization [ ]
- stored salt (iodinated) [ ]

APPENDIX V: CHECKLIST FOR FOCUS GROUP DISCUSSIONS FOR IDD SURVEY IN MAINLAND TANZANIA AND ZANZIBAR

1. Introduction of visitors and group members and statement on the purpose of the study.
2. Find out if the group has heard of IDD problem.
3. (a) Find out if the group knows the health effects of iodine deficiency
   (b) If they know, ask them to mention the disorders
4. Ask the group members if they have ever seen a person with goitre
5. Probe if they know the cause of goitre
6. Find out if the group members know how to prevent/treat goitre (Probe) on the ways of preventing goitre).
7. Ask them if they have ever seen iodinated oil capsules (IOCs)
8. (a) Ask them if they have swallowed the IOCs
   (b) Probe on when and where
9. Probe on their compliance to IOC
10. Ask them the source of salt used at their homes (within their locality).
11. Ask them if they know whether the salt they use at home is iodated or not.
12. Probe how they know that the salt is iodinated
13. Ask them on their compliance opinion in using iodated salt
14. (a) Find out whether they prefer coarse or fine salt
    (b) Probe the reasons for their preference
15. Find out how they store their salt at home.

Appendix V1: Proportion of use of I-salt* at household level and TGP** at regional level and median UIC*** at district level in schoolchildren (6-12yrs) in 2004, in order of regional I-salt coverage

Results by region								**Results for the district in each region that was selected for urinary iodine concentration measurement**									
Region		Household use of iodated salt			Total goitre prevalence			District	Household use of iodated salt			Total goitre prevalence			Urinary iodine concentrations		
	Clusters per region	Number of salt samples tested	Samples with iodine n (%)	Traffic light status	Total number of children examined	Children with goitre n (%)	Traffic light status		Number of salt samples tested	Samples with iodine n (%)	Traffic light status	Total number of children examined	Children with goitre n (%)	Traffic light status	Number of urine samples analysed	Median (µg/L	Traffic light status
Kagera	15	6739	6716 (99.7)	G	4574	35 (0.8)	G	Bukoba	816	816 (100.0)	G	549	6 (1.1)	G	209	192.5	G
Kigoma	9	6937	6909 (99.6)	G	4516	109 (2.4)	G	Kibondo	1426	1426 (100.0)	G	815	41 (5.0)	Y	210	254.6	G
Mara	12	5717	5696 (99.6)	G	4254	623 (14.4)	Y	Musoma	1521	1514 (99.5)	G	1139	174 (15.2)	Y	211	230.5	G
Mwanza	24	12497	12438 (99.5)	G	8509	24 (0.3)	G	Ilemela	1412	1406 (99.6)	G	995	0 (0.0)	G	208	372.5	P
Tabora	18	7985	7881 (98.7)	G	5966	116 (1.9)	G	Sikonge	926	926 (100.0)	G	701	1 (0.1)	G	210	236.4	G
Arusha	15	8658	8549 (98.7)	G	6408	576 (9.0)	Y	Monduli	1075	1063 (98.9)	G	737	120 (16.3)	Y	209	280.0	G
Morogoro	15	5544	5306 (95.7)	G	4773	223 (4.5)	G	Kilosa	917	896 (97.7)	G	808	31 (2.6)	G	212	166.7	G
Dodoma	15	6647	6292 (94.7)	G	4349	166 (3.8)	G	Dodoma	2293	2283 (99.6)	G	1895	70 (5.3)	Y	210	203.6	G
Mbeya	21	7534	6640 (88.1)	Y	5628	956 (7.0)	Y	Mbeya	1066	1055 (99.0)	G	691	135 (19.5)	Y	208	147.0	G
Shinyanga	21	9160	8005 (87.4)	Y	5855	66 (1.1)	G	Kishapu	1036	939 (90.6)	G	665	3 (0.4)	G	208	224.5	G
Dar es Salaam	9	2420	2094 (86.5)	Y	2631	8 (0.3)	G	Temeke	937	663 (70.8)	Y	993	2 (0.2)	G	211	887.0	P
Ruvuma	12	4175	3523 (84.4)	Y	2681	46 (1.7)	G	Namtumbo	558	494 (88.5)	Y	259	1 (0.4)	G	206	45.1	R
Singida	9	4172	3521 (84.4)	Y	2358	56 (2.4)	G	Singida	1180	791 (67.0)	Y	595	12 (2.0)	G	210	90.2	Y
Kilimanjaro	15	5927	4856 (81.9)	Y	4607	184 (4.0)	G	Hai	1215	1215 (100.0)	G	986	31 (2.5)	G	220	396.5	P
Pwani	18	4791	3730 (77.9)	Y	3396	10 (0.3)	G	Kisarawe	1107	971 (87.7)	Y	763	0 (0.0)	G	210	836.3	P
Tanga	21	6125	4627 (75.5)	Y	5555	215 (3.9)	G	Muheza	899	485 (53.9)	Y	734	32 (4.4)	G	325	185.7	G
Manyara	15	7047	5267 (74.7)	Y	4866	541 (11.1)	Y	Simanjiro	1154	1154 (100.0)	G	889	66 (7.4)	Y	211	412.4	P
Mtwara	12	5237	3368 (64.3)	Y	3645	1 (0.0)	G	Masasi	1967	1326 (67.4)	Y	1417	0 (0.0)	G	212	64.7	Y
Rukwa	9	3797	1414 (37.2)	R	2610	367 (14.1)	Y	Mpanda	1186	729 (61.5)	Y	881	110 (12.5)	Y	201	270.8	G
Iringa	18	6711	2471 (36.8)	R	4275	838 (19.6)	Y	Mufindi	1052	238 (22.6)	R	702	110 (27.1)	O	211	92.9	Y
Lindi	15	4121	1048 (25.4)	R	2590	21 (0.9)	G	Liwale	534	307 (57.5)	Y	285	2 (0.7)	G	209	72.6	Y
Total/unweighted mean	**318**	**131941**	**110350 (83.6)**	**Y**	**94046**	**5181 (5.5)**	**Y**	**Total**	**24277**	**20697 (85.3)**	**Y**	**17499**	**1027 (5.7)**	**Y**	**4522**	**203.6**	G

NB: Overall coverage (national) for iodated salt* = 83.6% (95% CI: 83.4, 83.8), Total goitre prevalence** = 5.5% (95%CI: 5.3, 5.6),

Overall I-salt coverage for districts sub-sampled for urinary iodine concentration*** = 85.3% (95% CI: 84.9, 85.8), TGP = 5.7 % (95 % CI 5.63, 5.71). Overall median UIC = 203.6 (95% CI: 192.0, 215.2) µg/L

Key to traffic light alphabetical colour codes (according to WHO [1] except for iodated salt, where two more categories were added): I_salt coverage: 0 - 49.9% (very poor) = red (R), 50 - 89.9% (poor/unsatisfactory) = yellow (Y), >90% (adequate) = green (G). TGP: 0 - 4.9 % (not of public health significance) =green (G), 5 - 19.9% (mild) = yellow (Y), 20 - 29.9% (moderate) = orange (O), ≥30% (severe) = red (R)

Median urinary iodine: 0 - 49.9 µg/L (very insufficient) = red (R), 50-99.9 µg/L (insufficient) = yellow (Y), 100 - 299.9 µg/L adequate= green (G), ≥300 µg/L (excessive intake) = pink (P).

APPENDIX VII: **PUBLICATIONS/BOOKS BY VINCENT ASSEY**

1. **Assey VD**, Tylleskär T, Momburi PB, Maganga M, Reilly M, Mlingi NV, Greiner T, Peterson S. Improved salt iodation methods for small scale salt producers in low-resource settings in Tanzania. *BMC Public Health* 2009, **9:**187doi:10.1186/1471-2458-9-187.
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3. **Assey VD**, Peterson S, Greiner T. Sustainable universal salt iodization in low-income countries - time to re-think strategies? European J Clin Nutr. 2008 Feb;62(2):292-4.
4. **Assey VD**, Mgoba C, Mlingi N, Sanga A, Ndossi GD, Greiner T, Peterson S. Remaining challenges in Tanzania's efforts to eliminate iodine deficiency. Public Health Nutr. 2007 Oct;10(10):1032-8.
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10. Peterson S, **Assey V**, Dalenbring M, Lorri W, Gebre-Medhin M. Adequate Iodine Status in a Rwandan Refugee Population Despite Residence in an Iodine Deficient Area of Tanzania. *Svensaka Lakaresallskapets Riksstamm Stockholm: Svenska Lakaresallskapets Handlingar Hygiea*, 1995:380
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REPORTS

1. **Assey VD** et al., Prevention and Control of Iodine Deficiency Disorders in Tanzania: Five Year National Plan of Action 2007/08 – 2111/12; July 2007
2. **Assey VD**, Muganda G, Mselle L, Sanga AB, Lyamuya V, Nombo A, Mwanyika S. Monitoring Universal Salt Iodation in Tanzania: Report on supervision of salt iodation and mobilization of small salt producers in 13 districts to form working groups for sustainable salt production and iodation - July 2007
3. **Assey VD**, Fatma A, Muganda G, Nombo A, Mwanyika S Nihuka A, Ndossi G. Control of iodine deficiency disorders: Supportive supervision report in salt producing sites along the coastal belt of Indian Ocean in Tanzania. TFNC/Micronutrient Report April 2008
4. **Assey VD**, Muganda G, Fatma A, Ndossi G. Control of iodine deficiency disorders: Mobilization of small scale salt producers and awareness creation in low performing districts in Tanzania. TFNC/Micronutrient Report October 2007
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6. Kimboka S, **Assey VD**, Sanga AB. National IDD survey in Tanzania: Preliminary report TFNC Report 2002; 200
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15. **Assey VD**, (Supervisors: Dr Collin Toothill, Prof Karen Lee). Fluorimetric measurements of heam synthetase activity (*in vitro*) in anaemia due to erythropoetic protoporphyria, iron deficiency and lead poisoning. Research project report: Part of fulfillment of *Master Degree*, Department of Chemical Pathology, University of Leeds, Leeds, UK July 1991**.**

Appendix VIII: Thematic focus group discussion - a tool used for Paper V

1 **Introductory part:** Who are we and the purpose of our visit in the salt factories

2 Knowledge of salt workers about iodine deficiency and prevention

a. Ever heard or seen a person with goitre?
b. What do you think are the causes of goitre?
c. Probe if they can list other examples of iodine deficiency disorders
d. Is there any disabled subject in your area suspected to be due to iodine deficiency?
e. How do you normally treat subjects with goitre in your families?

3 Type and source of salt commonly used at home

a. What type of salt commonly used at home?
b. Source of salt?

4 Awareness on salt iodation

a. Time period they have been working in the salt factories
b. Have you heard of iodated salt?
c. How do you know if the salt is iodated?
d. Have you ever had training regarding salt quality and iodation

5 Information about the procedures for salt iodation

a. Who is responsible for salt iodation?
b. Deduce if there is any guideline for salt iodation
c. Probe them to describe procedures for salt iodation?
d. Probe on the weighing instruments and their working status
e. Probe on amount of potassium iodate used and for what quantities of salt is/are iodated
f. Observe on the iodation procedures and relate with discussion
g. Probe on the salt packaging and storage
h. Source of potassium iodate and price kilogram
i. Probe if they have enough supplies for salt iodation and testing iodine

6 Information about supervision during salt production and salt iodation

a. Who does supervision to ensure salt is adequately iodated?
b. What is used to measure or test salt for adequate iodine?
c. If there is any penalty given to workers found not iodating the salt properly?
d. How often the salt factory is visited by external authority to check the salt if it iodated within a week or/and months
e. If yes; is there any penalty given if the salt was found not adequately iodated?
f. At the end give brief talk on the IDD problem, effects and its prevention and control using iodated salt.

7 Workers' opinion regarding knowledge gained on the importance of iodine in salt