Appendix 1

Questionnaire for Collecting Data for the Survey of Bovine Brucellosis

Note: This questionnaire is designed for a survey on the potential risk factors associated with Bovine Brucellosis and economic impact.

Date ..../........./.........Serial No: ....

State: ....Locality: ....

Owner name: ……………………. Age: …………………………….

Phone No.: ………………………….Address: …………………………

Education level: …………………….

Farm Total Cattle Numbers: ………………………………

Herd Data:-

Herd Type: one species   Multi species

Herd size: Small (≤ 30)   Large (> 30)

 Breed: Local   Cross

Sex: Male   Female

Age: < 3 years   > 3 years

Management type: Intensive   Simi- Extensive

Breeding type   Natural   Artificial

Calving bar   Yes   No

 Bull share ;   Yes   No

Source of water ;   wells   Tape   water

Common canal

Animal Health Data;

 Veterinary Service: absent   present

 Vaccination;   Yes   No

   Abortion   Yes   No

   Awareness   Yes   No

 Product Price;

Price of lb milk……………………………………………………………

Price of male calves at weaning…………………………………………

Price of female calves at weaning……………………………………….

Appendix 2

2.1 Distribution of serum sample of brucellosis by the localities in Khartoum state

	Frequency	Percent	Cumulative Percent
Valid Sherg elneel	275	21.4	21.4
Bahry	312	24.3	45.7
Khartoum	144	11.2	56.9
Omdurman	238	18.5	75.4
Umbada	208	16.2	91.6
Karary	109	8,5	100.0
Total	286	100.0	

2.2: Frequency table which determined distribution of the age:

	Frequency	Percent	Cumulative Percent
Valid Less than 3 years	201	15,6	15.6
More than 3 Years	1085	84.4	100.0
Total	1286	100.0	

2 3: Frequency table which determined distributiution of sex:

	Frequency	Percent	Cumulative Percent
Valid Male	18	1.4	1.4
Female	1268	98.6	100.0
Total	1286	100.0	

2.4.: Frequency table which determined distributiution of breed:

	Frequency	Percent	Cumulative Percent
Valid Local	41	3.2	3.2
Cross	1245	96.8	100.0
Total	1286	100.0	

2.5: Frequency table which determined distribution of herd size:

Valid	Frequency	Percent	Cumulative Percent
Small (<=30)	99	15.5	15.5
Medem (30-60)	316	15.5	
Large (>60)	1286	60.0	100.0
Total		100.0	

2.6: Frequency table which determined   distribution of   herdtype:

	Frequency	Percent	Cumulative Percent
Valid Mixed species	247	19.2	19.2
Cattle only	1039	80.8	100.0
Total	1286	100.0	

.7: Frequency table which determined distribution of breeding method:

	Frequency	Percent	Cumulative Percent
Valid Natural	1182	91.9	91.9
Artificial	104	8.1	100.0
Total	1286	100.0	

2.8 Frequency table which determined distribution of owner awareness:

	Frequency	Percent	Cumulative Percent
Valid Yes	760	59.1	59.1
No	526	40.9	100.0
Total	1286	100.0	

2.9: Frequency table which determined distribution of Water source:

	Frequency	Percent	Cumulative Percent
Valid Tap Water	334	26.0	26.0
well	952	74.0	100.0
Total	1286	100.0	

2.10.: Frequency table which determined distribution of Veterinary Service:

	Frequency	Percent	Cumulative Percent
Valid Present	1262	98.1	98.1
Abscent	24	1.9	100.0
Total	1286	100.0	

2.11.: Frequency table which determined distribution of Vaccination:

	Frequency	Percent	Cumulative Percent
Valid Yes	965	75.0	75,0
No	321	25.0	100.0
Total	1286	100.0	

2.12.. presence and absence of Separate Pen for Calving:

	Frequency	Percent	Cumulative Percent
Valid Yes	1263	98.2	98.2
No	23	1.8	100.0
Total	1286	100.0	

2.13: Frequency table which determined distribution of Using Shared Male for Breeding:

	Frequency	Percent	Cumulative Percent
Valid No	1190	92.5	92.5
Yes	96	7.5	100.0
Total	1286	100.0	

2.14: Frequency table which determined distribution of History of Abortion:

	Frequency	Percent	Cumulative Percent
Valid No	997	77.5	77.5
Yes	289	22.5	100.0
Total	1286	100.0	

2.15: Frequency table which determined distribution of Housing:

	Frequency	Percent	Cumulative Percent
Valid			
intensive	1066	82.9	82,9
semi-intensive	220	17,1	100.0
Total	1286	100.0	

2.16: Frequency table which determined distribution of Bllosis :

	Frequency	Percent	Cumulative percent
Valid			
Negative	954	74.2	74.2
Positive	332	25.8	100.0
Total	1286	100.0	

Appendix 3

3.1 Seroprevalence of Brucellosis in the localities of Khartoum state

	Localities						Total
	Nile East	Bahry	Khartoum	Omdurman	Ombada	Karari	
RBPT Negative	209 209/272X100 77.1%	210 210/312x100 70.5%	96 96/144x100 66.7%	183 183/238x100 76,9%	144 144/208x100 69.2/%	99 99/109x100 90.8%	954 74.2%
Positive	63 37/272X100 22.9%	92 92/312X100 29.5%	48 48/144x100 33.3%	55 55/238X100 23.1%	64 64/208X100 30.8%	10 10/109x100 9.2%	332 25.8%
Total	272 100.0%	312 100.0%	144 100.0%	238 100.0%	208 100.0%	109 100,0%	1286 100.0%

3.2: Seroprevalence of Brucellosis in cattle in relation to age:

	<3 years	>3 Years	Total
RBPT Negative	188 188/201X100 93,5%	766 94/1085X100 70.6%	594 74.2%
Positive	13 13/201X100 6.5%	319 34/1085X100 29,4%	332 25.8%
Total	201 100.0%	1085 100.0%	1286 100.0%

3.3: Seroprevalence of Brucellosis in cattle in relation to sex:

	Sex		Total
	Male	Female	
RBPT Negative Positive	17 17/18X100 94.4%	937 221/298X100 73.9%	954 74.2%
Total	1/18X100 5.6%	331 77/298x100 25.8%	332 25.8%
	18 100.0%	1268 100.0%	1286 100.0%

3.4: Seroprevalence of Brucellosis in cattle in relation to breed:

	Local	Cross	Total
RBPT Negative	38 38/41X100 92.7%	916 916/1245X100 73.6%	954 74.2%
Positive	3 3/41X100 7.3%	329 329/1245X100 26.4%	77 25.8%
Total	41 100.0%	1245 100.0%	1286 100.0%

3.5: Seroprevalence of Brucellosis in cattle in relation to Herdtype.

	Herdtype		
	Catlle only	Mixed species	Total
RBPT Negative	749 749/1039X100 72.1%	205 205/247X100 75.3%	954 74.2%
	290 290/1039X100 27.9%	42 42/247X100 24.7%	332 25.8%
Positive Total	1039 100.0%	247 100.0%	1286 100.0%

3.6: Seroprevalence of Brucellosis in cattle in relation to Vaccination:

	Vaccination		Total
	Yes	No	
RBPT Negative	692 692/965 X 100 71.7%	262 262/321 X 100 81.6%	954 954/1286 X 100 74.2%
Positive	273 273/965 X 100 28.3%	59 59/321 X 100 18.4%	332 332/1286 X 100 25.8%
Total	965 100.0%	321 100.0%	1286 100.0%

3.7: Seroprevalence of Brucellosis in cattle in relation to breeding method :

	Breeding method		
	Artificial	Natural	Total
RBP Negative	77 77/104X100 74.0%	877 261/1182X100 74.2%	954 74.2%
Positive	27 27/104X100 26.0%	305 305/1182X100 25.8%	332 25.8%
Total	104 100.0%	1182 100.0%	1286 100.0%

3.8: Seroprevalence of Brucellosis in cattle in relation to Herdsize

	Herdsize			Total
	(<=30)	30-60	(>60)	
RBPT Negative	147 147/199X100 73.9%	238 2383/316X100 75.3%	569 569/771X100 73.8%	954 74.2%
Positive	52 52/199X100 26.1%	78 78/316X100 24.7%	202 202/771x100 26.0%	332 25.8
Total	199 100.0%	316 100.0%	771 100.0%	1286 100.0%

3.9: Seroprevalence of Brucellosis in cattle in relation to Housing :

	Housing		Total
	intensine	Semi-intensine	
RBPT Negative	778 778/1066X100 73.0%	176 176/ 220X100 80.0%	954 74.2%
Positive	288 288/1066X100 27.0%	44 44/220X100 20.0%	332 25.8%
Total	1066 100.0%	220 100.0%	1286 100.0%

3.10: Seroprevalence of Brucellosis in cattle in relation to Water source:

	Water Source			Total
	Tap Water	Well	Common canall	
RBPT Negative	208 208/301X100 69.1%	716 716/952X100 75.2%	30 30/33X100 90.9%	954 74.2%
Positive	93 93/301X100 30.9%	236 236/952X100 24.8%	3 3/339,1X100 9.1%	332 25.8%
Total	301 100.0%	952 100.0%	33 100.0%	1286 100.0%

3.11: Seroprevalence of Brucellosis in cattle in relation to Veterinary Service:

	Veterinary Services		Total
	Present	Abscent	
RBPT Negative	941 954/1262X100 73.2%	13 73/107X100 54.2%	954 74.2%
Positive	321 321/1262X100 25.4%	11 11/247X100 45,8%	332 25.8%
Total	1262 100.0%	24 100.0%	1286 100.0%

3.12: Seroprevalence of Brucellosis in cattle in relation to Abortion History:

	Abortion History		Total
	Yes	No	
RBPT Negative	747 747/997X100 74.9%	207 207/289X100 71.6%	954 74.2%
Positive	250 250/997X100 25.1%	82 82/289X100 28.4%	332 25.8%
Total	997 100.0%	289 100.0%	1286 100.0%

3.13: Seroprevalence of Brucellosis in cattle in relation to presence and absence of Separate Pen for Calving:

	Presence of separate Calving pens		Total
	Yes	No	
RBPT Negative	934 934/1263X100 74.0%	20 20/23X100 87.0%	954 74.2%
Positive	329 329/1263X100 26.0%	3 3/23X100 13.0%	332 25.8%
Total	1263 100.0%	23 100.0%	1286 100.0%

3.14: Seroprevalence of Brucellosis in cattle in relation to Using Shared Bull for Breeding:

	Bull Shareing for Breeding		
	No	Yes	Total
RBPT Negative	873 873/1190X100 73.4%	81 81/96X100 84.4%	954 74.2%
Positive	317 317/1190X100 26.6%	15 15/96X100 15.6%	332 25.8%
Total	1190 100.0%	96 100.0%	1286 100.0%

3.15: Seroprevalence of Brucellosis in cattle in relation to Owner awareness:

	Owner awareness		
	Yes	No	Total
RBPT Negative	545 545/760X100 71.7%	409 409/526X100 77.8%	954 74.2%
positive	215 215/760X100 28.3%	117 117/526X100 22.2%	332 25.8%
Total	760 100.0%	526 100.0%	1286 100.0%

3.16: Seroprevalence of Brucellosis in cattle in relation to Mixed Age:

	Mixed Age		Total
	No	Yes	
RBPT Negative	934	20	954
	934/1263x100	20/23X100	
	74.0%	87.0%	74.2%
Positive	329	3	332
	329/1263X100	3/23X100	
	26.0%	13.0%	25.8%
Total	1263	23	1286
	100.0%	100.0%	100.0%

Appendix 4

4.1: Association between bovine brucellosis infection and localities:

	Value	df	Sig. (2-sided)
Pearson Chi-Square	26.995	5	.000
Likelihood Ratio	30.278	5	.000
Linear-by-Linear Association	.o50	1	.823
N of Valid Cases	1286		

4.2. Association between bovine brucellosis infection and age:

	Value	df	Sig. (2-sided)
Pearson Chi-Square	46,57	1	.000
Likelihood Ratio	45.381	1	.000
Linear-by-Linear Association	58.231	1	.000
N of Valid Cases	1286		

4.3: Association between bovine brucellosis infection and sex:

	Value	df	Sig. (2-sided)
Pearson Chi-Square	.695	1	.048
Likelihood Ratio	1.191	1	.023
Linear-by-Linear Association	.693	1	.048
N of Valid Cases	1286		

4.4: Association between bovine brucellosis infection and herd type:

	Value	df	Sig. (2-sided)
Pearson Chi-Square	12.397	1	.000
Likelihood Ratio	13.288	1	.000
Linear-by-Linear Association	12.387	1	.000
N of Valid Cases	1286		

4.5: Association between bovine brucellosis infection and herdsize:

	Value	df	Sig. (2-sided)
Pearson Chi-Square	.281	2	.869
Likelihood Ratio	.283	2	.868
Linear-by-Linear Association	.277	1	.842
N of Valid Cases	1286		

4.6: Association between brucellosis infection and breed:

	Value	df	Sig. (2-sided)
Pearson Chi-Square	7.568	1	.006
Likelihood Ratio	9.596	1	.002
Linear-by-Linear Association	7.562	1	.006
N of Valid Cases	1286		

4.7: Association between brucellosis and veterinary services:

	Value	df	Sig.(2-sided)
Pearson Chi-Square	5.117	1	.024
Likelihood Ratio	4.107	1	.033
Linear-by-Linear Association	5.113	1	.024
N of Valid Cases	1286		

4.8: Association between brucellosis and vaccinations:

	Value	df	Sig.(2-sided)
Pearson Chi-Square	12.352	1	.000
Likelihood Ratio	11.84	1	.000
Linear-by-Linear Association	12.343	1	.000
N of Valid Cases	1286		

4.9: Association between brucellosis and Abortion History:

	Value	df	Sig.(2-sided)
Pearson Chi-Square	1.273	1	.259
Likelihood Ratio	1.255	1	.263
Linear-by-Linear Association	.1.272	1	.259
N of Valid Cases	1286		

4.10: Association between brucellosis and owner awareness:

	Value	df	Sig. (2-sided)
Pearson Chi-Square	.5.933	1	.015
Likelihood Ratio	.6.001	1	.014
Linear-by-Linear Association	.5.929	1	.015
N of Valid Cases	1286		

4.11: Association between brucellosis and Mixed agee:

	Value	df	Sig.(2-sided)
Pearson Chi-Square	1.995	1	.158
Likelihood Ratio	2.294	1	.130
Linear-by-Linear Association	1,993	1	.158
N of Valid Cases	1286		

4.12: Association between brucellosis and Breeding method:

	Value	df	Sig.(2-sided)
Pearson Chi-Square	,001	1	.972
Likelihood Ratio	.001	1	.972
Linear-by-Linear Association	.001	1	.972
N of Valid Cases	1286		

4.13: Association between brucellosis and calving barn:

	Value	df	Sig.(2-sided)
Pearson Chi-Square	1.995	1	.158
Likelihood Ratio	2.294	1	.130
Linear-by-Linear Association	1.993	1	.158
N of Valid Cases	1286		

4.14: Association between brucellosis and Water source:

	Value	df	Sig.(2-sided)
Pearson Chi-Square	9.401	2	.009
Likelihood Ratio	10.367	2	.006
Linear-by-Linear Association	.8.125	1	.004
N of Valid Cases	1286		

4.15: Association between brucellosis and Housing:

	Value	df	Sig. (2-sided)
Pearson Chi-Square	4.688	1	.030
Likelihood Ratio	4.900	1	.027
Linear-by-Linear Association	4.685	1	.030
N of Valid Cases	1286		

4.16: Association between brucellosis and Using Shared Bull for Breeding:

	Value	df	Sig. (2-sided)
Pearson Chi-Square	5.626	1	.018
Likelihood Ratio	6.207	1	.013
Linear-by-Linear Association	5.622	1	.018
N of Valid Cases	1286		