TIPPERAH : Laksham (1938)					MYMENSINGH : Nandail (1939)			
R. P.							4708	0·47
1	265	0·91	1004	*2·68	265	0·87	1031	1·92
2·25	199	0·13			199	*2·59		
4	165	0·67	190	0·74	165	0·02		
6·25	133	0·76			133	1·83		
9	115	1·47			115	0·82		
12·25	99	0·25			99	0·99		
16	83	0·15	43	0·01	83	*2·66	126	0·47
25	65	1·99			65	0·28		
36	49	1·23			49	0·49		

TABLE 13—*Contd.*

Size of Grids (in acres)	Model		Field		Model		Field	
	D. F.	t	D. F.	t	D. F.	t	D. F.	t
(1)	(2·1)	(2·2)	(3·1)	(3·2)	(2·1)	(2·2)	(3·1)	(3·2)
	RANGPUR : Pirgachha (1939)				RANGPUR : Palashbari (1939)			
R. P.			2488	1·58			2657	1·89
1	265	1·79			265	1·32	588	1·94
2·25	199	0·90			199	0·68		
4	165	0·92	200	1·20	165	0·65		
6·25	133	0·99			133	0·28		
9	115	*3·23			115	0·07	220	0·68
12·25	99	0·92			99	0·28		
16	83	0·07	199	1·16	83	1·53		
25	65	1·01			65	0·73		
36	49	0·24			49	*2·46		

TABLE 14

Value of "t"—Statistic for Comparisons based on Field Surveys

Thana	Comparison between Random Plots and Grids of different sizes						Comparison between Grids of different sizes			
	Size	D.F.	"t"	Size	D.F.	"t"	Size	Size	D.F.	"t"
(1)	(2·1)	(2·2)	(2·3)	(3·1)	(3·2)	(3·3)	(4·1)	(4·2)	(4·3)	(4·4)
MYMENSINGH										
Jamalpur ...	1—acre	6628	1·00	9—acre	5744	*2·33	1—acre	9—acre	1740	1·84
Nandail ...	1 „	5739	1·36	16 „	4834	0·59	1 „	16 „	1157	1·29
Kishoreganj ...	4 „	2667	0·42	36 „	2527	1·29	4 „	36 „	268	0·73
Netrokona ...	1 „	526	0·61	9 „	528	0·34	1 „	9 „	208	0·89
Trisal ...	4 „	615	0·54	16 „	569	*2·03	4 „	16 „	132	1·26
Bajitpur ...	4 „	1318	0·86	36 „	1194	0·08	4 „	36 „	156	0·51
Melandah ...	1 „	1820	1·52	4 „	1632	*2·76	1 „	4 „	350	1·36

TABLE 14—*Contd.*

Value of "t"—Statistic for Comparisons based on Field Surveys

Thana	Comparison between Random Plots and Grids of different sizes						Comparison between Grids of different sizes			
	Size	D.F.	"t"	Size	D.F.	"t"	Size	Size	D.F.	"t"
(1)	(2·1)	(2·2)	(2·3)	(3·1)	(3·2)	(3·3)	(4·1)	(4·2)	(4·3)	(4·4)
RANGPUR										
Pirgachha ...	4—acre	2688	0·29	16—acre	2687	1·90	4—acre	16—acre	399	1·65
Palashbari ...	1 „	3245	0·40	9 „	2877	0·54	1 „	9 „	808	0·82
Rangpur ...	4 „	1464	1·91	36 „	1157	0·83	4 „	36 „	427	0·90
Nilphamari ...	1 „	2433	1·15	9 „	2298	0·05	1 „	9 „	401	0·87
Kurigram ...	4 „	737	0·32	16 „	686	0·39	4 „	16 „	155	0·61
Gaibandha ...	1 „	4873	0·35	4 „	4750	*2·30	1 „	4 „	859	1·46

Pabna

Belkuchi ...	1—acre	2547	1·57	9—acre	2366	0·62	1—acre	9—acre	547	1·75
Kamarkhand ...	1 „	1481	*3·16	9 „	1374	1·30	1 „	9 „	313	0·92
Pabna ...	1 „	1537	0·10	36 „	1589	0·21	1 „	36 „	312	0·14
Ullapara ...	4 „	4310	*2·42	36 „	4080	0·98	4 „	36 „	394	*2·41

24 Parganas

Titagarh ...	1—acre	341	1·16	9—acre	305	0·88	1—acre	9—acre	100	0·25
Barasat ...	1 „	2079	0·44	16 „	1767	*2·50	1 „	16 „	518	*2·83
Basirhat ...							1 „	4 „	427	0·30
Basirhat ...							1 „	36 „	401	0·63
Basirhat ...							4 „	36 „	70	0·29
Deganga ...	4 „	2866	1·02	9 „	2944	*3·46	4 „	9 „	230	1·01
Baduria ...	1 „	1702	0·83	9 „	1282	0·75	1 „	9 „	496	1·14
Amdanga ...	1 „	1446	0·38	9 „	1393	*2·83	1 „	9 „	159	1·97

TABLE 14—*Contd.*

Value of "t"—Statistic for Comparisons based on Field Surveys

Thana	Comparison between Random Plots and Grids of different sizes						Comparison between Grids of different sizes			
	Size	D. F.	"t"	Size	D.F.	"t"	Size	Size	D.F.	"t"
(1)	(2·1)	(2·2)	(2·3)	(3·1)	(3·2)	(3·3)	(4·1)	(4·2)	(4·3)	(4·4)
HOOGHLY										
Serampore ...	1—acre	100	0·91	36—acre	97	0·43	1—acre	36—acre	37	0·44
Chanditala ...	1 „	1130	0·34	9 „	1035	1·64	1 „	9 „	155	1·59
Dhaniakhali ...	1 „	1473	*3·66	4 „	682	0·04	1 „	4 „	893	*2·37
Tarakeswar ...	1 „	924	0·01	4 „	831	0·41	1 „	4 „	275	0·36
Uttarpara ...							1 „	9 „	69	0·84
Uttarpara ...							1 „	36 „	50	0·36
Uttarpara ...							9 „	36 „	37	0·54

TABLE 15.

Model Sampling Experiments : Observed and Graduated Variances

DISTRICT—Mymensingh THANA—Iswarganj (1938)

b = 9·73 g = 0·3377 p = 0·3712

(B) Comparison between Observed and Graduated Variances

Size of Grids	No. of Grids	Logarithm of Variance		Difference $= \log\left(\frac{v}{v'}\right)$	Chi-square $= \frac{n}{2}\log^2\left(\frac{v}{v'}\right)$	Variance	
		Observed	Expected			Observed	Expected
(x)	(n)	log (v)	log (v′)			(v)	(v′)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	1756	−0·95094	−0·96446	0·01352	0·1607	0·1120	0·1085
2·25 ,,	1377	−1·09001	−1·08340	0·00661	0·0301	0·0813	0·0825
4·00 ,,	1161	−1·18115	−1·16778	0·01337	0·1038	0·0659	0 0680
6·25 ,,	951	−1·23885	−1·23323	0·00562	0·0150	0·0577	0·0585
9·00 ,,	832	−1·29680	−1·28671	0·01009	0·0424	0 0505	0·0517
12·25 ,,	732	−1·34243	−1·33193	0·01050	0·0404	0·0454	0·0466
16·00 ,,	618	−1·37777	−1·37110	0·00667	0·0137	0·0419	0·0426
25·00 ,,	476	−1·40012	−1·43655	0·03643	0·3159	0·0398	0·0366
36·00 ,,	365	−1·46566	−1·49003	0·02437	0·1084	0 0342	0·0324
		D. F. = 7		Chi-square = 0·8304		P = 0·9957	

TABLE 16

Model Sampling Experiments : Observed and Graduated Variances

DISTRICT : Dacca THANA : Tejgaon (1938) p = 0·0930

(A) Comparison between different Samples

Size of Grids	No. of Grids	Logarithm of Variance			Chi-square	Variance		
		1st Sample	2nd Sample	3rd Sample		1st Sample	2nd Sample	3rd Sample
(x)	(n)	log (v_1)	log (v_2)	log (v_3)		(v_1)	(v_2)	(v_3)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1·00 acre	133	−1·2534	−1·2589	−1·5650	4·2299	0·0558	0·0551	0·0272
2·25 „	100	−1·4789	−1·6737	−1·4506	1·4754	0·0332	0·0212	0·0354
4·00 „	83	−1·6108	−1·6003	−1·5492	0·0902	0·0245	0·0251	0·0282
6·25 „	67	−1·7645	−1·7100	−1·5267	1·0398	0·0172	0·0195	0·0297
9·00 „	58	−1·7496	−1·7328	−1·8211	0·1275	0·0178	0·0185	0·0151
12·25 „	50	−1·8097	−1·7773	−1·9854	0·6269	0·0155	0·0167	0·0103
16·00 „	42	−1·6478	−1·9245	−1·6962	0·9172	0·0225	0·0119	0·0201
25·00 „	33	−1·5986	−2·2147	−1·6819	3·6872	0 0252	0·0061	0·0208
36·00 „	25	−1·8386	−1·9666	−1·5888	0·9230	0·0145	0·0108	0·0258

D. F. = 18 Chi-square = 13·1171 P = 0·7841

(B) Comparison between Observed and Graduated Variances

b = 15·51 g = 0·2924

Size of Grids	No. of Grids	Logarithm ot Variance		Difference	Chi-square	Variance	
		Observed	Expected	$= \log\left(\frac{v}{v'}\right)$	$= \frac{n}{2} - \log^a\left(\frac{v}{v'}\right)$	Observed	Expected
(x)	(n)	log (v)	log (v′)			(v)	(v′)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	399	−1·4045	−1·4218	0·0173	0·0597	0·0394	0·0379
2·25 „	300	−1·5249	−1·5248	0·0001	0·0000	0·0299	0·0299
4·00 „	249	−1·5893	−1·5978	0·0085	0·0090	0·0257	0·0252
6·25 „	201	−1·6570	−1·6545	0·0025	0·0006	0·0220	0·0222
9·00 „	174	−1·7696	−1·7008	0·0688	0·4118	0·0170	0·0199
12·25 „	150	−1·8533	−1·7400	0·1133	0·9628	0·0140	0·0182
16·00 „	126	−1·7436	−1·7739	0·0303	0·0578	0·0180	0·0168
25·00 „	99	−1·7352	−1·8306	0·0954	0·4505	0·0184	0·0148
36·00 „	75	−1·7801	−1·8769	0·0968	0·3514	0·0166	0·0133

D. F. = 7 Chi-square = 2·3036 P = 0·9374

TABLE 17.

Model Sampling Experiments : Observed and Graduated Variances

District—TIPPERAH Thana—LAKSAM (1938) $p = 0{\cdot}0242$

(A) Comparison between different Samples

Size of Grids	No. of Grids	Logarithm of Variance		Difference	Chi-square	Variance	
		1st Sample	2nd Sample	$= \log \left(\frac{v_1}{v_2}\right)$	$= \frac{n}{4} \log^2 \left(\frac{v_1}{v_2}\right)$	1st Sample	2nd Sample
(x)	(n)	$\log (v_1)$	$\log (v_2)$			(v_1)	(v_2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	133	−2·0311	−2·1627	0·1316	0·5758	0·0093	0·0069
2·25 „	100	−2·0445	−2·2455	0·2010	1·0100	0·0090	0 0057
4·00 „	83	−2·4051	−2·5299	0·1248	0·3232	0·0039	0·0030
6·25 „	67	−2·4559	−2·5168	0·0609	0·0621	0·0035	0·0030
9·00 „	58	−2·3853	−2·4117	0·0264	0·0101	0·0041	0·0039

12·25 acre	50	−2·5078	−2·5100	0·0022	0·0001	0·0031	0·0031
16·00 „	42	−2·7905	−2·4909	0·2996	0·9425	0·0016	0·0032
25·00 „	33	−2·3976	−2·4927	0·0951	0·0746	0·0040	0·0032
36·00 „	25	−2·9772	−2·7298	0·2474	0·3825	0·0011	0·0019

D. F. = 9 Chi-square = 3·3809 P = 0·9442

TABLE 17—*Contd.*

(B) Comparison between Observed and Graduated Variances

b = 14·33 g = 0·4006

Size of Grids	No. of Grids	Logarithm of Varince		Difference	Chi-square	Variance	
		Observed	Expected	$= \log \left(\frac{v}{v'}\right)$	$= \frac{n}{2} \log^2 \left(\frac{v}{v'}\right)$	Observed	Expected
(x)	(n′)	log (v)	log (v′)			(v)	(v′)
(1)	(2)	(3)	(4)	5))	(6)	(7)	(8)
1·00 acre	266	−2·0937	−2·0903	0·0034	0·0015	0·0081	0·0081
2.25 ,,	200	−2·1337	−2·2314	0·0977	0·9545	0·0074	0·0059
4·00 ,,	166	−2·4634	−2·3315	0·1319	1·4440	0·0034	0·0047
6·25 ,,	134	−2·4881	−2·4091	0·0790	0·4181	0·0033	0·0039
9·00 ,,	116	−2·4012	−2·4726	0·0714	0·2957	0·0040	0·0034
12·25 ,,	100	−2·5100	−2·5262	0·0162	0·0131	0·0031	0·0030
16·00 ,	84	−2·6091	−2·5727	0·0364	0·0556	0·0025	0·0027
25·00 ,,	66	−2·4449	−2·6503	0·2054	1·3922	0·0036	0·0022
36·00 ,,	50	−2·8447	−2·7137	0·1310	0·4290	0·0014	0·0019

D. F. = 7 Chi-square = 5·0037 P = 0·6600

TABLE 18.

Model Sampling Experiments Observed and Graduated Variances

District—MYMENSINGH Thana—NANDAIL (1939) p = 0·3634

(A) Comparison between different Samples

Size of Grids	No. of Grids	Logarithm of Variance		Difference	Chi-square	Variance	
		1st Sample	2nd Sample	$= \log \left(\frac{v_1}{v_2}\right)$	$= \frac{n}{4} \log^2 \left(\frac{v_1}{v_2}\right)$	1st Sample	2nd Sample
(x)	(n)	log (v_1)	log (v_2)			(v_1)	(v_2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	133	−1·0007	−1·0886	0·0879	0·2569	0·0998	0·0815
2·25 ,,	100	−1·1160	−1·1330	0·0170	0·0072	0·0766	0·0736
4·00 ,,	83	−1·1638	−1·2835	0·1197	0·2973	0·0686	0.0521
6·25 ,,	67	−1·2248	−1·2092	0·0156	0·0041	0·0596	0·0618
9.00 ,,	58	−1·3266	−1·3504	0·0238	0·0082	0·0471	0·0446
12·25 ,,	50	−1·4149	−1·3563	0·0586	0·0429	0·0385	0·0440
16·00 ,,	42	−1·4178	−1·2525	0·1653	0·2869	0·0382	0·0559
25·00 ,,	33	−1·3832	−1·4881	0·1049	0·0908	0·0414	0·0325
36·00 ,,	25	−1·3944	−1·5777	0·1833	0·2100	0·0403	0·0264

D.F. = 9 Chi-square = 1·2043 P = 0·9978

TABLE 18—*Contd.*

(B) Comparison between Observed and Graduated Variances

b = 26·91 g = 0·2812

Size of Grids	No. of Grids	Logarithm of Variance		Difference $-\log\left(\frac{v}{v'}\right)$	Chi-square $=\frac{n}{2}\log^2\left(\frac{v}{v'}\right)$	Variance	
		Observed	Expected			Observed	Expected
(x)	(n)	log (v)	log (v′)			(v)	(v′)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	266	−1·0441	−1·0379	0·0062	0·0051	0·0903	0·0916
2·25 ,,	200	−1·1264	−1·1369	0·0105	0·0110	0·0748	0·0730
4·00 ,,	166	−1·2183	−1·2072	0·0111	0·0102	0·0605	0·0621
6·25 ,,	134	−1·2201	−1·2617	0·0416	0·1159	0·0602	0·0547
9·00 ,,	116	−1·3290	−1·3062	0·0228	0·0302	0·0469	0·0494
12·25 ,.	100	−1·3884	−1·3439	0·0445	0·0990	0·0409	0·0453
16·00 ,,	84	−1·3316	−1·3765	0·0449	0·0847	0·0466	0·0420
25·00 ,,	66	−1·4370	−1·4310	0·0060	0 0012	0·0366	0·0371
36·00 ,,	50	−1·4843	−1·4755	0·0088	0·0019	0·0328	0·0335

D.F. = 7 Chi-square = 0·3592 P = 0·9981

TABLE 19

Model Sampling Expeniments : Observed and Graduated Variances

DISTRICT—Rangpur THANA—Pirgachha (1939) p = 0·2778.

(A) Comparison between different Samples

Size of Grids	No. of Grids	Logarithm of Variance		Difference	Chi-square	Variance	
		1st Sample	2nd Sample	$= \log \left(\frac{v_1}{v_2}\right)$	$= \frac{n}{4} \log^2 \left(\frac{v_1}{v_2}\right)$	1st Sample	2nd Sample
(x)	(n)	long (v_1)	long (v_2)			(v_1)	(v_2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	133	−1·1864	−1·0675	0·1189	0·4701	0·0651	0 0856
2·25 „	100	−1·4976	−1·3080	0·1896	0·8987	0·0318	0·0492
4·00 „	83	−1·4486	−1·4145	0·0341	0·0241	0·0356	0·0385
6·25 „	67	−1·3429	−1·5361	0·1932	0.6252	0·0454	0·0291
9·00 „	58	−1·7122	−1·6271	0·0851	0·1050	0·0194	0·0236
12·25 „	50	−1·6162	−1·5607	0·0555	0·0385	0·0242	0·0275
16·00 „	42	−1·5768	−1·5918	0·0150	0·0023	0·0265	0·0256
25·00 „	33	−1·7375	−1·7570	0·0195	0·0031	0·0183	0·0175
36·00 „	25	−1·7570	−1·7545	0·0025	0·0001	0·0175	0·0176
		D.F. = 9			Chi-square = 2·1671		P = 0·9868

TABLE 19—*Contd.*

(B) Comparison between Observed and Graduated Variances

b = 14·39 g = 0·4076

Size of Grids	No. of Grids	Logarithm of Variance		Difference	Chi-square	Variance	
		Observed	Expected	$-\log\left(\frac{v}{v'}\right)$	$=\frac{n}{2}\log^2\left(\frac{v}{v'}\right)$	Observed	Expected
(x)	(n)	log (v)	log (v′)			(v)	(v′)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	266	−1·1244	−1·1697	0·0453	0·2729	0·0751	0·0677
2·25 „	200	−1·3899	−1·3132	0·0767	0·5883	0·0407	0·0486
4·00 „	166	−1.4338	−1·4151	0·0187	0·0290	0·0368	0·0385
6·25 „	134	−1·4248	−1·4941	0·0693	0·3218	0·0376	0·0321
9·00 „	116	−1·6649	−1·5586	0·1063	0·6554	0·0216	0·0276
12·25 „	100	−1·5906	−1·6132	0·0226	0·0255	0·0257	0 0244
16·00 „	84	−1·5882	−1·6605	0·0123	0·0064	0·0258	0·0219
25·00 „	66	−1·7530	−1·7395	0·0135	0·0060	0·0177	0·0182
36·00 „	50	−1·7635	−1·8040	0·0405	0·0410	0·0172	0·0157
		D. F. = 7		Chi-square = 1·9463		P = 0·9616	

TABLE 20.

Model Sampling Experiments : Observed and Graduated Variances

DISTRICT—Rangpur THANA—Palashbari (1939) p = 0·3344

(A) Comparison between different Samples

Size of Grids	No. of Grids	Logarithm of Variance		Difference	Chi-square	Variance	
		1st Sample	2nd Sample	$= \log\left(\frac{v_1}{v_2}\right)$	$= \frac{n}{4}\log^2\left(\frac{v_1}{v_2}\right)$	1st Sample	2nd Sample
(x)	(n)	Log (v_1)	Log (v_2)			(v_1)	(v_2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	133	−1·1597	−1·2365	0·0768	0·1961	0·0692	0·0580
2·25 ,,	100	−1·3352	−1·3671	0·0319	0·0254	0·0462	0·0429
4·00 ,,	83	−1·4197	−1·3400	0·0797	0·1318	0·0380	0·0457
6·25 ,,	67	−1·5565	−1·3598	0·1967	0·6481	0·0278	0·0437
9·00 ,,	58	−1·4557	−1·7189	0·2632	1·0045	0·0350	0·0191
12·25 ,,	50	−1·5006	−1·5347	0·0341	0·0145	0·0316	0·0292
16·00 ,,	42	−1·6148	−1·6052	0·0096	0·0010	0·0243	0·0248
25·00 ,,	33	−1·7231	−1·7842	0·0611	0·0308	0·0189	0·0164
36·00 ,,	25	−1·7051	−1·6912	0·0139	0·0012	0·0197	0·0204
		D. F. = 9			Chi-square = 2·0534		P = 0·9901

TABLE 20—*Contd.*

(B) Comparison between Observed and Graduated Variances

b = 37·86 g = 0·3485

Size of Grids	No. of Grids	Logarithm of Variance		Difference	Chi-square	Variance	
		Observed	Expected	$-\log\left(\frac{v}{v'}\right)$	$=\frac{n}{2}\log^2\left(\frac{v}{v'}\right)$	Observed	Expected
(x)	(n)	log (v)	log (v′)			(v)	(v′)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	266	−1·1952	−1·2025	0·0073	0·0071	0·0638	0·0627
2·25 ,,	200	−1·3491	−1·3252	0·0239	0·0571	0·0448	0·0473
4·00 ,,	166	−1·3769	−1·4123	0·0354	0·1040	0·0420	0·0387
6·25 ,,	134	−1·5095	−1·4808	0·0287	0·0552	0·0309	0·0331
9·00 ,,	116	−1·5648	−1·5350	0·0298	0·0515	0·0272	0·0292
12·25 ,,	100	−1·5217	−1·5817	0·0600	0·1800	0·0301	0·0262
16·00 ,,	84	−1·6151	−1·6221	0·0070	0·0021	0·0243	0·0239
25·00 ,,	66	−1·7530	−1·6897	0·0633	0·1322	0·0177	0·0204
36·00 ,,	50	−1·7035	−1·7448	0·0413	0·0426	0·0198	0·0180

D. F. = 7 Chi-square = 0·6318 P = 0·9967

TABLE 21.

Model Sampling Experiments : Observed and Graduated Variances
District—PABNA Thana—BELKUCHI (1939) p = 0·1650
(A) Comparison between different Samples

Size of Grids	No. of Grids	Logarithm of Variance		Difference $= \log\left(\frac{v_1}{v_2}\right)$	Chi-square $= \frac{n}{4}\log^2\left(\frac{v_1}{v_2}\right)$	Variance	
		1st Sample	2nd Sample			1st Sample	2nd Sample
(x)	(n)	$\log(v_1)$	$\log(v_2)$			(v_1)	(v_2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	133	−1·5319	−1·5823	+0·0504	0·0845	0·0294	0·0262
2·25 ,,	100	−1·6204	−1·6590	+0·0386	0·0372	0·0240	0·0219
4·00 ,,	83	−1·6331	−1·7471	+0·1140	0·2697	0·0233	0·0179
6·25 ,,	67	−1·7893	−1·7864	−0·0029	0·0001	0·0162	0·0164
9·00 ,,	58	−1·6748	−1·8164	+0·1416	0·2907	0·0211	0·0153
12·25 ,,	50	−1·9169	−1·9471	+0·0302	0·0144	0·0121	0·0113
16·00 ,,	42	−2·0021	−1·9482	−0·0539	0·0305	0·0100	0·0113
25·00 ,,	33	−1·7498	−2·1051	+0·3553	1·0415	0·0178	0·0079
36·00 ,,	25	−1·9581	−2·0520	+0·0939	0·0551	0·0110	0·0089
		D.F. = 9			Chi-square = 1·8207		P = 0·9929

TABLE 21—*Contd.*

(B) Comparison between Observed and Graduated Variances

b = 217·55 g = 0·2918

Size of Grids	No. of Grids	Logarithm of variance		Difference $-\log\left(\frac{v}{v'}\right)$	Chi-square $-\frac{n}{2}\log^2\left(\frac{v'}{v}\right)$	Variance	
		Observed	Expected			Observed	Expected
(*x*)	(*n*)	log (v)	log (v′)			(v)	(v′)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1·00 acre	266	−1·5573	−1·5428	0·0145	0·0280	0·0277	0·0287
2·25 ,,	200	−1·6402	−1·6456	0·0054	0 0029	0·0229	0·0226
4·00 ,,	166	−1·6869	−1·7185	0·0316	0·0829	0·0206	0·0191
6·25 ,,	134	−1·7881	−1·7751	0·0130	0·0113	0·0163	0·0168
9·00 ,,	116	−1·7300	−1·8213	0·0913	0·4835	0·0186	0·0150
12·25 ,,	100	−1·9329	−1·8603	0·0726	0·2635	0·0117	0·0138
16·00 ,,	84	−1·9794	−1·8942	0·0852	0·3049	0·0105	0·0128
25·00 ,,	66	−1·8975	−1·9507	0·0532	0·0934	0·0127	0·0112
26·00 ,,	50	−2·0045	−1·9970	0·0075	0·0014	0·0099	0·0101

D.F. = 7 Chi-square = 1·2718 *P* = 0·9854

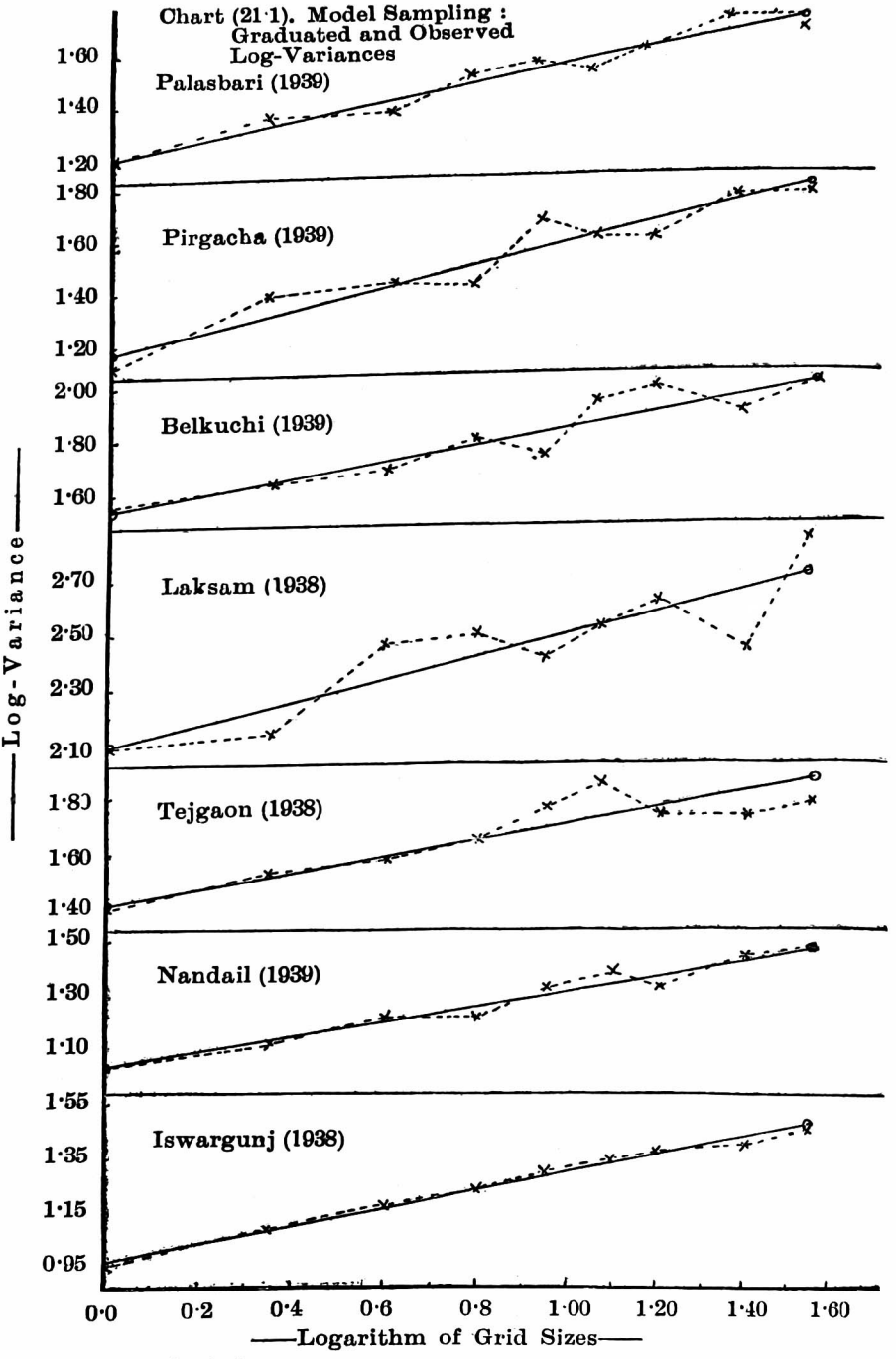
Chart (21·1). Model Sampling : Graduated and Observed Log-Variances
Palasbari (1939)
Pirgacha (1939)
Belkuchi (1939)
Laksam (1938)
Tejgaon (1938)
Nandail (1939)
Iswargunj (1938)
1·60
1·40
1·20
1·80
1·60
1·40
1·20
2·00
1·80
1·60
2·70
2·50
2·30
2·10
1·80
1·60
1·40
1·50
1·30
1·10
1·55
1·35
1·15
0·95
—Log-Variance—
0·0
0·2
0·4
0·6
0·8
1·00
1·20
1·40
1·60
—Logarithm of Grid Sizes—
Graduated
Observed

TABLE 22.

Observed Variances with Standard Errors based on Field Surveys 1939

Thana	N	Variance ± S. E.	N	Variance ± S. E.	N	Variance ± S. E.
(1)	(2·1)	(2·2)	(3·1)	(3·2)	(4·1)	(4·2)
MYMENSINGH						
	Random Plots		1—Acre		4—Acre	
Jamalpur ...	5317	0·1198 ± 0·0023	1313	0·0662 ± 0·0025		
Nandail ...	4709	0·1928 ± 0·0040	1032	0·0975 ± 0·0042		
Kishoreganj ...	2464	0·1636 ± 0·0047			205	0·0510 ± 0·0053
Netrokona ...	424	0·1329 ± 0·0091	104	0·0671 ± 0·0084		
Trisal ...	527	0·1460 ± 0·0090			90	0·0633 ± 0·0064
Bajitpur ...	1179	0·1509 ± 0·0064			141	0·0804 ± 0·0053
Melandah ...	1452	0·1309 ± 0·0049	370	0·0682 ± 0·0059	182	0·0626 ± 0·0053

	9-Acre		16-Acre		36-Acre	
Jamalpur ...	429	0·0351 ± 0·0021				
Nandail ...			127	0·0472 ± 0·0046		
Kishoreganj ...					65	0·0195 ± 0·0046
Netrokona ...	106	0·0343 ± 0·0040				
Trisal ...			44	0·0332 ± 0·0058		
Bajitpur ...					17	0·0381 ± 0·0073
Melandah ...						

RANGPUR

	Random Plots		1-Acre		4-Acre	
Pirgachha ...	2489	0·1610 ± 0·0046			201	0·0437 ± 0·0050
Palashbari ...	2658	0·1740 ± 0·0048	589	0·0664 ± 0·0049		
Rangpur ...	1098	0·1287 ± 0·0057			368	0·0242 ± 0·0029
Nilphamari ...	2166	0·1775 ± 0·0054	269	0·0982 ± 0·0074		
Kurigram ...	635	0·1106 ± 0·0062			104	0·0334 ± 0·0047
Gaibandha ...	4383	0·1701 ± 0·0037	492	0·0725 ± 0·0052	369	0·0417 ± 0·0038

TABLE 22—*contd.*

Observed Variances with Standard Errors based on Field Surveys 1939

Thana	N	Variance ± S. E.	N	Variance ± S. E.	N	Variance ± S. E.
(1)	(2·1)	(2·2)	(3·1)	(3·2)	(4·1)	(4·2)
	9—Acre		16—Acre		36—Acre	
Pirgachha ...			200	0·0214 ± 0·0031		
Palashbari ...	221	0·0290 ± 0·0039				
Rangpur ...					61	0·0085 ± 0·0034
Nilphamari ...	134	0 0469 ± 0·0050				
Kurigram ...			53	0·0239 ± 0·0042		
Gaibandha ...						

TABLE—23

Observed Variances with Standard Errors based on Field Surveys 1939

Thana	N	Variance ± S. E.	N	Variance ± S. E.	N	Variance ± S. E.
(1)	(2·1)	(2·2)	(3·1)	(3·2)	(4·1)	(4·2)
PABNA						
	Random Plots		1-Acre		4-Acre	
Belkuchi ...	2184	0·0724 ± 0·0022	365	0·0570 ± 0·0043		
Kamarkhand ...	1272	0·1783 ± 0·0071	211	0·0594 ± 0·0082		
Pabna ...	1258	0·0956 ± 0·0038	281	0·0441 ± 0·0042		
Ullapara ...	3999	0·1365 ± 0·0031			321	0·0350 ± 0·0034
	9 Acre		16 Acre		36 Acre	
Belkuchi ...	184	0·0222 ± 0·0029				
Kamarkhand ...	104	0·0240 ± 0·0057				
Pabna ...					33	0·0246 ± 0·0052
Ullapara ...					83	0·0208 ± 0·0032

TABLE 23—*Contd.*

Observed Variances with Standard Errors based on Field Surveys 1939

Thana ...	N	Variance ± S. E.	N	Variance ± S. E.	N	Variance ± S. E.
(1)	(2·1)	(2·2)	(3·1)	(3·2)	(4·1)	(4·2)
24-Parganas						
	Random Plots		1-Acre		4-Acre	
Titagarh (Gr.) ...	274	0·0185 ± 0·0016	69	0·0023 ± 0·0009		
Barasat ...	1665	0·0733 ± 0·0025	416	0·0206 ± 0·0018		
Basirhat ...			380	0·0515 ± 0·0035	49	0·0244 ± 0·0061
Deganga ...	2791	0·0880 ± 0·0024			77	0·0129 ± 0·0031
Baduria ...	1245	0·1061 ± 0·0044	459	0·0311 ± 0·0032		
Amdanga ...	1341	0·0506 ± 0·0020	107	0·0251 ± 0·0020		

	9-Acre		16-Acre		36-Acre	
Titagarh (Gr.) ...	33	0·0010 ± 0·0006				
Barasat ...			104	0·0081 ± 0·0014		
Basirhat ...					23	0·0082 ± 0·0043
Degangа ...	155	0·0062 ± 0·0017				
Baduria ...	39	0·0266 ± 0·0052				
Amdanga ...	54	0·0030 ± 0·0013				

HOOGHLY

	Random Plots		1-Acre		4-Acre	
Serampore ...	81	0·0500 ± 0·0079	21	0·0374 ± 0·0080		
Chanditala ...	1006	0·1208 ± 0·0054	126	0·0641 ± 0·0053		
Dhaniakhali ...	632	0·0529 ± 0·0030	843	0·0284 ± 0·0016	52	0·0122 ± 0·0041
Tarakeswar ...	741	0·1261 ± 0·0066	185	0·0574 ± 0·0054	92	0·0392 ± 0·0048
Uttarpara ...			42	0·0110 ± 0·0037		

TABLE 23—*Contd.*

Observed Variances with Standard Errors based on Field Surveys 1939

Thana ...	N	Variance ± S. E.	N	Variance ± S. E.	N	Variance ± S. E.
(1)	(2·1)	(2·2)	(3·1)	(3·2)	(4·1)	(4·2)
	9-Acre		16-Acre		36-Acre	
Serampore ...					18	0·0082 ± 0·0026
Chanditala ...	31	0·0200 ± 0·0051				
Dhaniakhali ...						
Tarakeswar ...						
Uttarpara ...	29	0·0182 ± 0·0022			10	0·0031 ± 0·0023

TABLE 24.

Field Survey 1939 : Proportional Variances for Grids of Different Sizes.

Thana	Binomial Variance	Logarithm of ratio of binomial to observed variance					
	(pq)	R.P.	1-acre	4-acre	9-acre	16-acre	36-acre
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Jamalpur ...	0·1640	0·1364	0·3940	...	0·6696	...	...
Nandail ...	0.2340	0.0841	0·3802	...	...	0·6953	...
Kishoreganj ...	0·2171	0·1229	...	0·6291	...	...	1·0466
Netrokona ...	0·1543	0.0648	0·3618	...	0·6531	...	...
Trisal ...	0·1734	0·0747	...	0·4373	...	0·7179	...
Bajitpur ...	0·1776	0·0707	...	0·3442	...	...	0·6685
Melandah ...	0·2018	0·1880	0·4711	0·5083	...	...	...
Pirgachha ...	0·1996	0·0934	...	0·6597	...	0·9698	...
Palashbari ...	0·2145	0·0909	0·5093	...	0·8690	...	...

TABLE 24—*contd.*

Field Survey 1939 : Proportional Variances for Grids of Different Sizes

Thana	Binomial Variance	Logarithm of ratio of binomial to observed variance					
	(*pq*)	R.P.	1-acre	4-acre	9-acre	16-acre	36-acre
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rangpur ...	0·1565	0·0849	...	0·8107	...	...	1·2651
Nilphamari ...	0·2172	0·0877	0·3447	...	0·6657	...	...
Kurigram ...	0·1364	0·0911	...	0·6111	...	0·7564	...
Gaibandha ...	0·2051	0·0813	0·4516	0·6918	...	...	...
Belkuchi ...	0·1469	0·3073	0·4112	...	0·8207	...	...
Kamarkhand ...	0·2148	0·0809	0·5582	...	0·9518	...	...
Pabna ...	0·1256	0·1185	0·4546	...	...	...	0·7081
Ullapara ...	0·1725	0·1016	...	0·6927	...	...	0·9187
Titagarh (Gr.) ..	0·0127	−0·1634	0·7421	...	1·1038	...	...

Barasat	...	0·0650	−0·0529	0·4990	...	...	0·9044	...
Bashirhat	...	0·1213	...	0·3721	0·6965	...	...	1·1701
Deganga	...	0·0779	−0·0530	...	0·7810	1·0981	...	...
Baduria	...	0 1213	0·0582	0·5911	...	0·6590	...	...
Amdanga	...	0·0365	−0·1419	0·1629	...	1·0856	...	...
Serampur	...	0·0659	0·1199	0 2460	...	...	...	0·9051
Chanditala	...	0·1061	−0·0564	0·2188	...	0·7247	...	...
Dhaniakhali	...	0·0835	0·1982	0·4684	0·8353	...	...	...
Tarakeswar	...	0·1322	0·0205	0·3623	0·5279	...	...	...
Uttarpara	...	0·0432	...	0·5941	...	0·3762	...	1 1441
Average log ratio	...	...	0·0696	0·4297	0·6327	0·8064	0·8088	0·9783
Average ratio	...	...	1·1721	2·6897	4·2924	6·4032	6·4387	9·5126

Exponential graduation excluding random plots : g = 0·3459, b = 17·80

TABLE (25·1).

Variance Function : Graduated Parameters and Goodness of Fit

Thana	Proportion under Jute (p)	Area Surveyed in sq. miles	Coefft. of variation. $\left(100\sqrt{\frac{q}{p}}\right)$	Graduated value of Parameters		Comparison between			
						Different Samples		Graduated and observed values	
				"g"	"b"	x^2	p^*	x^2	$p_7^\dagger$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Iswarganj ...	·3712	121	130	0·3377	9·73	—	—	0·83	·9957
Tejgaon ...	·0930	46	312	0·2924	15·51	13·12	·7841	2·30	·9374
Laksam ...	·0242	45	635	0·4006	14·33	3·38	·9442	5·00	·6600
Nandail ...	·3634	123	132	0·2812	26·91	1·20	·9978	0·36	·9981
Pirgachha ...	·2778	98	161	0·4076	14·39	2·17	·9868	1·95	·9616
Palashbari ...	·3344	75	141	0·3485	37·86	2·05	·9901	0·63	·9967
Belkuchi ...	·1650	55	225	0·2918	217·55	1·82	·9929	1·27	·9854
Total ...		563		0·3328	16·37	23·74	·9999	12·34	1·0000

*No. of Degrees of Freedom = 9 in every case excepting Tejgaon for which it is 18

‡No. of Degrees of Freedom is 7 in every case for comparison of Graduated and Observed Values.

TABLE (25·2).

Sample Survey of 1935 : Variances for 40—acre Grids

Name of District	Area in square miles	Sample Survey with 40—acre Grids (1935)				Calculated Variance Formula (2)	Ratio of Variances
		No. of Thanas	No. of Grids	Proportion under Jute	Observed Variance		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mymensingh ...	6237	51	416	0·1660	·0218	·0156	1·40
Dacca ...	2713	35	180	0·1617	·0281	·0153	1·84
Rangpur ...	3496	30	240	0·1216	·0119	·0120	0·99
Tipperah ...	2597	20	84	0·1492	·0283	·0143	1·98
Faridpur ...	2356	25	173	0·1273	·0127	·0125	1·02
Rajshahi ...	2609	24	176	0·0622	·0085	·0066	1·29
Bogra ...	1384	12	92	0·0997	·0157	·0101	1·55
Pabna ...	1818	17	120	0·1162	·0176	·0116	1·52
Jessore ...	2102	24	194	0·0591	·0074	·0063	1·17
24-Parganas ...	5257	32	122	0·0486	·0073	·0052	1·40

Geometric mean value of ratio = 1·38

TABLE 26

Observed Cost of Field Survey in Hours per Square Mile (1939) by Districts and Thanas

Districts and Thanas	Density	Enumeration	Journey	Miscellaneous	Sub-total (2·1)—(4·1)	Overhead	Total Field Cost
(1·1)	(1·2)	(2·1)	(3·1)	(4·1)	(5·1)	(6)	(7·1)
			Random Plots.				
Mymensingh-Netrokona	4	1·76	3·13	2·30	7·19	13·18	20·37
Hooghly-Serampore ...	4	1·17	0·95	1·76	3·88	10·46	14·34
24-Pgs-Titagarh (Gr.) ...	4	1·27	1·60	1·44	4·31	12·64	16·95
Weighted Average ...	4	1·44	2·04	1·89	5·37	12·21	17·58
Rangpur-Kurigram	6	1·60	3·44	1·42	6·46	13·61	20·07
Hooghly-Dhaniakhali ...	6	2·54	1·62	1·55	5·71	10·14	15·85
Weighted Average ...	6	2·06	2·56	1·48	6·10	11·93	18·03
Rangpur-Rangpur ...	9	2·09	3·62	1·18	6·89	12·48	19·37
Pabna-Pabna ...	9	2·46	4·15	1·47	8·08	13·64	21·72
Mymensingh-Trisal ...	9	2·38	2·83	0·77	5·98	10·35	16·33
Weighted-Average ...	9	2·31	3·63	1·20	7·14	12·41	19·55

Mymensingh-Melandah	16	3·21	4·20	1·77	9·18	17·36	26·54
Rangpur-Nilphamari ...	16	3·03	5·73	1·39	10·15	19·50	29·65
Mymensingh-Bajitpur...	16	2·24	2·87	1·77	6·88	14·53	21·41
24 Pgs-Barasat ...	16	1·74	2·09	1·67	5·50	14·34	19·84
24 Pgs-Baduria ...	16	2·81	2·23	2·48	7·52	13·40	20·92
Hooghly-Chanditala ...	16	2·76	2·61	1·55	6·92	22·41	29·33
Hooghly-Tarakeswar ...	16	3·30	4·20	1·70	9·20	17·53	26·73
Weighted Average ...	16	2·78	3·75	1·72	8·25	17·09	25·34
Pabna-Ullapara ...	25	3·63	5·44	1·78	10·85	17·34	28·19
Mymensingh-Jamalpur	25	3·71	3·19	1·53	8·43	17·00	25·43
Rangpur-Pingachha ...	25	3·72	4·22	1·57	9·51	19·97	29·48
24 Pgs.-Amdanga ...	25	2·15	0·93	1·74	4·82	15·56	20·38
Weighted Average ...	25	3·51	3·98	1·66	9·15	17·46	26·61

TABLE 26—*Contd.*

Observed Cost of Field Survey in Hours per Square Mile (1939) by Districts and Thanas

Districts and Thanas	Density	Enumeration	January	Miscellaneous	Sub-total (2·1)—(4·1)	Overhead	Total Field Cost
(1·1)	(1·2)	(2·1)	(3·1)	(4·1)	(5·1)	(6)	(7·1)
Pabna-Belkuchi ...	36	4·32	6·07	1·95	12·34	20·24	32·58
Mymensingh-Nandail ...	36	3·97	4·22	2·65	10·84	20·46	31·30
Mymensingh-Kishoreganj	36	4·43	3·47	2·93	10·83	20·41	31·24
Rangpur-Palashbari ...	36	3·19	3·78	0·81	7·78	17·33	25·11
Rangpur-Gaibandha ...	36	4·17	7·10	1·76	13·03	21·50	34·53
Pabna-Kamarkhand ...	36	3·96	4·28	1·88	10·12	20·14	30·26
24-Pgs-Deganga ...	36	3·67	1·94	2·64	8·25	14·79	23·04
Weighted Average ...	36	3·93	4·96	1·93	10·82	19·60	30·42

TABLE 27.

Observed Cost of Field Survey in Hours per Sq. Mile (1939) by Districts and Thanas

Districts and Thanas	Density	Enumeration	Journey	Miscellaneous	Sub-total (2·1)—(4·1)	Overhead	Total Field Cost
(1·1)	(1·2)	(2·1)	(3·1)	(4·1)	(5·1)	(6)	(7·1)
	1-Acre						
Mymensingh	1	0·96	1·77	1·47	4·20	10·24	14·44
Hooghly-Sarampore ...	1	0·82	1·05	0·78	2·65	12·88	15·53
24 Pgs-Titagarh (Gr.) ...	1	0·72	1·33	1·12	3·17	4 62	7·79
Weighted Average ...	1	0·85	1·54	1·28	3·67	8·33	12·00
Rangpur-Nilphamari ...	2	1·48	2·00	1·23	4·71	9 61	14·32
Pabna-Pabna	2	1·53	1·29	1·01	3·83	9·79	13·62
Hooghly-Chanditala ...	2	1·45	2·61	1·32	5·38	13·67	19·05
24 Pgs-Amdanga ...	2	0·94	1·61	1·05	3·60	6·61	10·21
Weighted Average ...	2	1·43	1·83	1·15	4·41	10·03	14·44

TABLE 27—*Contd.*

Observed Cost of Field Survey in Hours per Sq. Mile (1939) by Districts and Thanas

Districts and Thanas	Density.	Enumeration	Journey	Miscellaneous	Sub-total (2·1—4·1)	Overhead	Total Field Cost
(1·1)	(1·2)	(2·1)	(3·1)	(4·1)	(5·1)	(6)	(7·1)
Mymensingh-Melandah ...	4	2·61	1·71	1·15	5·47	12·02	17·49
Hooghly-Tarakeswar ...	4	2·12	2·04	1·82	5·98	15·92	21·90
24 Pgs-Basirhat	4	1·99	1·96	2·78	6·73	12·80	19·53
Rangpur-Gaibandha ...	4	2·05	2·65	1·01	5·71	7·88	13·59
24 Pgs-Barasat	4	1·90	3·20	0·80	5·90	11·64	17·54
Hooghly-Uttarpara ...	4	2·83	2·50	1·72	7·05	14·28	21·33
Weighted Average ...	4	2·13	2·28	1·66	6·07	11·61	17·68

Pabna-Belkuchi ...	...	6	2·51	4·67	0·98	8·16	11·31	19·47
Mymensingh-Jamalpur	...	6	3·19	1·65	1·02	5·88	11·34	17·20
24 Pgs-Baduria ...	...	6	3·71	3·53	3·16	10·40	21·83	32·23
Pabna-Kamarhand	...	6	3·06	3·88	1·22	8·16	19·71	27·87
Weighted Average	....	6	3·22	2·65	1·55	7·42	14·50	21·92
Mymensingh-Nandail	...	8	4·20	3·89	3·08	11·17	20·45	31·62
Rangpur-Palashbari	...	8	4·13	5·72	1·27	11·12	24·88	36·00
Hooghly-Dhaniakhali	...	8	3·35	1·97	2·67	7·99	16·24	24·23
Weighted Average	...	8	3·88	3·59	2·56	10·03	19·88	29·91

TABLE 28.

Observed Cost of Field Survey in Hours per Square Mile (1939) by Districts and Thanas

Districts and Thanas	Density	Enumeration	Journey	Miscellaneous	Sub-total (2·1)–(4·1)	Overhead	Total Field Cost
(1·1)	(1·2)	(2·1)	(3·1)	(4·1)	(5·1)	(6)	(7·1)
			4-Acre				
Hooghly-Dhaniakhali ...	½	0·86	1·23	1·31	3·40	11·54	14·94
24-Pgs.-Basirhat ...	½	0·44	1·03	0·95	2·42	6·50	8·92
Weighted Average ...	½	0·62	1·12	1·10	2·84	8·67	11·51
Rangpur-Kurigram ...	1	1·02	1·62	0·98	3·62	10·21	13·83
Mymensingh-Trisal ...	1	0·92	2·11	0·73	3·76	7·72	11·48
24-Pgs.-Deganga ...	1	0·94	1·58	2·16	4·68	10·40	15 08
Weighted Average ...	1	0·96	1·82	1·16	3·94	9·19	13·13

Pabna-Ullapara ...	2	1·33	2·83	0·77	4·93	8·94	13·87
Rangpur-Pirgachha ...	2	1·77	1·86	0·44	4·07	13·08	17·15
Mymensingh-Bajitpur ...	2	1·39	2·52	1·25	5·16	14·84	20·00
Mymensingh-Melandah ...	2	1·79	1·35	1·22	4·36	12·51	16·87
Hooghly-Tarakeswar ...	2	1·56	2·70	1·20	5·46	20·66	26·12
Weighted Average ...	2	1·55	2·23	0·93	4·71	12·29	17·00
Mymensingh-Kishoreganj	3	2·56	1·33	1·39	5·28	10·28	15·56
Rangpur-Rangpur ...	3	1·94	1·97	0·74	4·65	8·43	13·08
Rangpur-Gaibandha ...	3	2·52	2·27	0·95	5·74	12·33	18·07
Weighted Average ...	3	2·26	1·95	0·93	5·14	0·15	15·29

TABLE 28—*Contd.*

Observed Cost of Field Survey in Hours Per Square Mile (1939) by Districts and Thanas

Districts and Thanas	Density	Enumeration	Journey	Miscellaneous	Sub-total (2·1)—(4·1)	Overhead	Total Field Cost
(1·1)	(1·2)	(2·1)	(3·1)	(4·1)	(5·1)	(6)	(7·1)
			9-Acre				
24-Pgs.-Baduria ...	½	0·73	2·38	1·38	4·49	7·73	12·22
Hooghly-Chanditala ...	½	0·96	1·49	0·76	3·21	10·91	14·12
24-Pgs.-Titagarh (Gr.) ...	½	0·48	1·01	0·79	2·28	3·66	5·94
Weighted Average ...	½	0·72	1·67	1·00	3·39	7·42	10·81
Mymensingh-Netrokona...	1	1·49	1·90	1·02	4·41	7·85	12·26
Rangpur-Nilphamari ...	1	1·34	2·62	0·43	4·39	9·28	13·67
24-Pgs.-Amdanga ...	1	0·80	0·59	1·51	2·90	4·34	7·24
Weighted Average ...	1	1·33	2·13	0·75	4·21	8·14	12·35

Mymensingh-Jamalpur ...	2	2·33	2·73	1·71	6·77	15·49	22·26
24-Pgs-Deganga ...	2	1·83	1·89	2·35	6·07	12·91	18·98
Weighted Average ...	2	2·20	2·51	1·87	6·58	14·80	21·38
Rangpur-Palashbari ...	3	3·83	6·12	0·94	10·89	20·12	31·01
Pabna-Belkuchi ...	3	2·97	3·94	1·96	8·87	18·39	27·26
Pabna-Kamarkhand ...	3	3·31	3·98	1·64	8·93	19·78	28·71
Hooghly-Uttarpara ...	3	2·01	1·99	0·63	4·63	10·00	14·63
Weighted Average ...	3	3·29	4·61	1·48	9·38	18·84	28·22

TABLE 29

Observed Cost of Field Survey in Hours per Square Mile (1939)

By Districts and Thanas

Districts and Thanas	Density	Enumeration	Journey	Miscellaneous	Sub-total (2·1)-(4·1)	Overhead	Total Field Cost
(1·1)	(1·2)	(2·1)	(3·1)	(4·1)	(5·1)	(6)	(7·1)
			16—Acre				
Rangpur—Kurigram ...	½	0·65	0·76	0·70	2·11	3·69	5·80
Mymensingh—Trisal ...	½	0·79	1·26	0·49	2·54	5·26	7·80
Weighted Average ...	½	0·70	0·95	0·61	2·26	4·30	6·56
Mymensingh—Nandail ...	1	2·12	3·47	2·30	7·89	19·67	27·56
24 Pgs.—Barasat ...	1	1·11	1·37	1·01	3·49	6·97	10·46
Weighted Average ...	1	1·66	2·53	1·72	5·91	13·96	19·87
Rangpur—Pirgachha ...	2	2·50	2·67	0·95	6·12	12·77	18·89

Mymensingh—Bajitpur ...	¼	0·59	1·28	1·09	2·96	8·13	11·09
24 Pgs.—Basirhat ...	¼	0·70	0·79	0·87	2·36	6·40	8·76
Pabna—Pabna Sadar ...	¼	1·07	1·60	0·79	3·46	7·19	10·65
Weighted Average ...	¼	0·83	1·23	0·89	2·95	7·14	10·09
Pabna—Ullapara ...	½	1·24	3·71	0·83	5·78	9·11	14·89
Rangpur—Rangpur ...	½	0·65	1·61	0·42	2·68	5·71	8·39
Weighted Average ...	½	0·93	2·61	0·63	4·17	7·34	11·51
Mymensingh—Kishoreganj	1	2·03	1·81	0·91	4·75	9·36	14·11
Hooghly—Serampore ...	1	1·82	1·42	1·18	4·42	13·89	18·31
Pabna—Ullapara ...	1	0·90	2·50	0·90	4·30	14·90	19·20
Weighted Average ...	1	1·91	1·76	0·97	4·64	10·67	15·31

TABLE 30.

Observed Cost of Field Survey in Hours Per Square Mile (1939) (Average Values)

Size of Grids in acres	Density per. sq. mile	Enumeration	Journey	Miscellaneous	Sub-total (2·1) – (4·1)	Overhead	Total Field Cost
(1·1)	(1·2)	(2·1)	(3·1)	(4·1)	(5·1)	(6)	(7·1)
Random Plots	4	1·44	2·04	1·89	5·37	12·21	17·58
	6	2·06	2·56	1·48	6·10	11·93	18·03
	9	2·31	3·63	1·20	7·14	12·41	19·55
	16	2·78	3·75	1·72	8·25	17·09	25·34
	25	3·51	3·98	1·66	9·15	17·46	26·61
	36	3·93	4·96	1·93	10·82	19·60	30·42
1—Acre	1	0·85	1·54	1·28	3·67	8·33	12·00
	2	1·43	1·83	1·15	4·41	10·03	14·44
	4	2·13	2·28	1·66	6·07	11·61	17·68
	6	3·22	2·65	1·55	7·42	14·50	21·92
	8	3·88	3·59	2·56	10·03	19·88	29·91

4—Acre	½	0·62	1·12	1·10	2·84	8·67	11·51
	1	0·96	1·82	1·16	3·94	9·19	13·13
	2	1·55	2·23	0·93	4·71	12·29	17·00
	3	2·26	1·95	0·93	5·14	10·15	15·29
9—Acre	½	0·72	1·67	1·00	3·39	7·42	10·81
	1	1·33	2·13	0·75	4·21	8·14	12·35
	2	2·20	2·51	1·87	6·58	14·80	21·38
	3	3·29	4·61	1·48	9·38	18·84	28·22
16—Acre	½	0·70	0·95	0·61	2·26	4·30	6·56
	1	1·66	2·53	1·72	5·91	13·96	19·87
	2	2·50	2·67	0·95	6·12	12·77	18·89
36—Acre	¼	0·83	1·23	0·89	2·95	7·14	10·09
	½	0·93	2·61	0·63	4·17	7·34	11·51
	1	1·91	1·76	0·97	4·64	10·67	15·31

TABLE 31

Average Area of Mauzas and Plots

District	Thana	Number of		Total Area		Plots Per Mauza	Average Area (Acres)	
		Mauzas	Plots	Acres	Sq. miles		Per Mauza	Per Plot
(1·1)	(1·2)	(2·1)	(2·2)	(3·1)	(3·2)	(4)	(5·1)	(5·2)
Mymensingh	Bajitpur ...	89	93656	45100	70·47	1052	506·74	0·4815
	Jamalpur ...	362	187738	138015	215·65	519	381·26	0·7351
	Kishorganj ...	105	89591	37480	58·56	853	356·95	0·4183
	Melandah ...	136	71283	57602	90·00	524	423·54	0·8081
	Netrokona ...	235	119351	67815	105·96	508	288·57	0·5682
	Nandail ..	163	169020	80512	125·80	1037	493·94	0·4763
	Trisal ...	71	104402	58411	91·27	1470	822·69	0·5595
	TOTAL ...	1161	835041	484935	775·71	719	417 69	0·5807

Rangpur	Gaibandha	...	136	213216	79251	123·83	1568	582·73	0·3717
	Kurigram	...	77	134060	67847	106·01	1741	881·13	0·5061
	Nilphamari	...	101	265754	86709	135·48	2631	858·50	0·3263
	Palashbari	...	161	148154	47875	74·80	920	297·36	0·3231
	Pirgachha	...	169	141382	63752	99·61	837	377·23	0·4509
	Rangpur Sadar	...	149	192345	79013	123·46	1291	530·29	0·4108
	TOTAL	...	793	1094911	424447	663·19	1381	535·24	0·3877
Pabna	Belkuchhi	...	108	100334	39165	61·20	929	362·64	0·3903
	Kamarkhand	...	55	75848	22632	35·36	1379	411·49	0·2984
	Pabna (Sadar)	...	240	184393	90214	140·96	768	375·89	0·4892
	Ullapara	...	263	266745	102085	159·51	1014	388·16	0·3827
	TOTAL	...	666	627320	254096	397·03	942	381·53	0·4051

TABLE 31—*Contd.*

Average Area of Mauzas an Plots

Disticrt	Thana	Number of		Total Area		Plots Per Mauza	Average Area (Acres)	
		Mauzas	Plots	Acres	Sq. miles		Per Mauza	Per Plot
(1·1)	(1·2)	(2·1)	(2·2)	(3·1)	(3·2)	(4)	(5·1)	(5·2)
24 Parganas	Amdanga ...	81	116067	34234	53·49	1433	422·64	0·2950
	Baduria ...	110	194751	50437	78·81	1770	458·52	0·2590
	Barasat ...	207	231032	66540	103·97	1116	321·45	0·2880
	Basirhat ...	141	206502	60866	95·10	1465	431·67	0·2947
	Deganga ...	108	172250	49741	77·72	1595	460·56	0·2888
	Jagadal ...	28	34907	14086	22·01	1247	503·07	0·4035
	Khordah ...	36	39530	12974	20·27	1098	360·39	0·3282
	Naihati ...	19	25187	9614	15·02	1326	506·00	0·3817
	Titagarh ...	15	20313	7094	11·08	1354	472·93	0·3492
	TOTAL ...	745	1040539	305586	477·47	1397	410·18	0·2937

Hooghly	Chanditala	...	102	172625	40248	62·89	1692	394·59	0·2332
	Dhaniakhali	...	214	246957	67861	106·03	1154	317·11	0·2748
	Serampur	...	27	54960	13686	21·38	2036	506·89	0·2490
	Tarakeswar	...	90	112335	29646	46·32	1248	329·40	0·2639
	Uttarpara	...	12	22722	6993	10·93	1894	582·75	0·3078
	TOTAL	...	445	609599	158434	247·55	1370	356·03	0·2599
	GRAND TOTAL	...	3810	4207410	1627498	2542·95	1104	427·16	0·3868

TABLE—32

Average Number of Plots per Sample

1-Acre.

District	Thana	Density	Area in Sq. Miles	Total Number of		Number of Plots per Sample		
				Samples	Plots	Full	Part	Total
(1·1)	(1·2)	(2)	(3)	(4·1)	(4·2)	(5·1)	(5·2)	(5·3)
Mymensingh ...	Netrokona ...	1	105·96	106	635	0·24	5·75	5·99
Hooghly ...	Serampur ...	1	21·38	21	161	0·69	6·98	7·67
24 Parganas ...	Titagarh (Gr.)	1	68·38	69	525	0·61	7·00	7·61
TOTAL ...			195·72	196	1321	0·47	6·26	6·74
Rangpur ...	Nilphamari ...	2	135·48	269	2085	0·77	6·98	7·75
Pabna ...	Pabna Sadar ...	2	140·96	280	1870	0·33	6·35	6·68
Hooghly ...	Chanditala ...	2	62·89	126	1284	1·63	8·56	10·19
24 Parganas ...	Amdanga ...	2	53·49	106	906	0·68	7·87	8·55
TOTAL ...			392·82	781	6145	0·79	7·10	7·87

Mymensingh ...	Morandah ...	4	90·00	374	1863	0·10	4·88	4·98
Hooghly ...	Tarakeswar ...	4	46·32	185	1730	1·22	8·13	9·35
24 Parganas ...	Basirhat ...	4	95·10	380	3382	0·89	8·01	8·90
Rangpur ...	Gaibandha ...	4	123·83	495	3356	0·54	6·24	6·78
24 Parganas ...	Barasat ...	4	103·97	416	3769	0·91	8·15	9·06
Hooghly ...	Uttarpara ...	4	10·93	42	276	0·26	6·31	6·57
TOTAL ...			470·15	1892	14376	0·69	6·94	7·60
Pabna ...	Belkuchi ...	6	61·20	366	2847	0·39	7·39	7·78
Mymensingh ...	Jamalpur ...	6	215·65	1313	6709	0·10	5·01	5·11
24 Parganas ...	Baduria ...	6	78·81	463	4223	0·82	8·30	9·12
Pabna ...	Kamarkhand ...	6	35·36	212	1906	0·54	8·45	8·99
TOTAL ...			391·02	2354	15685	0·33	6·35	6·66
Mymensingh ...	Nandail ...	8	125·80	1032	6491	0·25	6·04	6·29
Rangpur ...	Palashbari ...	8	74·80	589	4641	0·71	7·17	7·88
Hooghly ...	Dhaniakhali ...	8	106·03	843	7199	1·11	7·43	8·54
TOTAL ...			306·63	2464	18331	0·67	6·78	7·44
GRAND TOTAL ...			1756·34	7687	55858	0·58	6·71	7·27

TABLE 33.

Average Number of Plots per Sample

4-Acre

District	Thana	Density	Area in Sq. Miles	Total Number of		Number of Plots per Sample		
				Samples	Plots	Full	Part	Total
(1·1)	(1·2)	(2)	(3)	(4·1)	(4·2)	(5·1)	(5·2)	(5·3)
Hooghly ...	Dhaniakhali ...	½	106·03	52	1206	7·88	15·31	23·19
24 Parganas ...	Basirhat ...	½	95·10	49	1070	6·33	15·50	21·83
TOTAL ...			201·13	101	2276	7·22	15·34	22·53
Rangpur ...	Kurigram ...	1	106·01	106	1648	4·20	11·35	15·55
Mymensingh ...	Trisal ...	1	91·27	90	1227	2·59	11·04	13·63
24 Parganas ...	Deganga ...	1	77·72	78	1845	6·86	16·79	23·65
TOTAL ...			275·00	274	4720	4·88	12·75	17·23

Pabna ...	Ullapara ...	2	159·51	321	5788	3·97	14·06	18·03
Rangpur ...	Pirgachha ...	2	99·61	201	3381	3·87	12·95	16·82
Mymensingh ...	Bajitpur ...	2	70·47	141	2297	3·91	12·38	16·29
Mymensingh ...	Melandah ...	2	90·00	182	2109	1·27	10·32	11·59
Hooghly ...	Tarakeswar ...	2	46·32	93	2383	8·97	16·65	25·62
TOTAL ...			465·91	938	15958	3·91	13·09	17·01
Mymensingh ...	Kishorganj ...	3	58·56	205	4541	5·32	16·83	22·15
Rangpur ...	Rangpur ...	3	123·46	369	6591	4·48	13·43	17·86
Rangpur ...	Gaibandha ...	3	123·83	373	6897	5·36	13·13	18·49
TOTAL ...			305·85	947	18029	4·92	14·02	19·04
GRAND TOTAL ...			1247·89	2260	40983	4·52	13·55	18·13

TABLE 33—*contd.*

Average Number of Plots per Sample

9-Acre

District	Thana	Density	Area in Sq. Miles	Total Number of		Number of Plots per Sample		
				Samples	Plots	Full	Part	Total
(1·1)	(1·2)	(2)	(3)	(4·1)	(4·2)	(5·1)	(5·2)	(5·3)
24 Parganas ...	Baduria ...	½	78·81	39	1855	22·35	25·21	47·56
Hooghly ...	Chanditala ...	½	62·89	31	1397	22·08	22·98	45·06
24 Parganas ...	Titagarh (Gr.)	½	11·08	33	1142	14·54	20·07	34·61
TOTAL ...			152·78	103	4394	19·62	23·04	42·66
Mymensingh ...	Netrokona ...	1	105·96	106	2834	9·09	17·65	26·74
Rangpur ...	Nilphamari ...	1	135·48	134	5154	16·92	21·54	38·46
24 Parganas ...	Amdanga ...	1	53·49	54	2426	19·77	25·16	44·93
TOTAL ...			294·93	294	10414	14·53	20·91	35·42

Mymensingh ...	Jamalpur ...	2	215·65	430	9357	5·88	15·88	21·76
24 Parganas ...	Deganga ...	2	77·72	155	7231	21·93	24·72	46·65
TOTAL ...			293·37	585	16588	10·21	18·14	28 36
Rangpur ...	Palashbari ...	3	74·80	221	9415	19·17	23·43	42·60
Pabna ...	Belkuchhi ...	3	61·20	184	6593	13·62	22·21	35·83
Pabna ...	Kamarkhand ...	3	35·36	104	4543	16·33	25·53	41·86
Hooghly ...	Uttarpara ...	3	10·93	30	1162	16·27	22·46	38·73
TOTAL ...			182·29	539	21718	16·81	23·21	40·28
GRAND TOTAL ...			923·37	1521	53109	13·91	20·87	34·92

TABLE—34.

Average Number of Plots per Sample

16—Acre

District	Thana	Density	Area in Sq. miles	Total number of		Number of Plots per Sample		
				Samples	Plots	Full	Part	Total
(1·1)	(1·2)	(2)	(3)	(4·1)	(4·2)	(5·1)	(5·2)	(5·3)
Rangpur ...	Kurigram ...	½	106·01	53	2374	23·29	21·50	44·79
Mymensingh ...	Trisal ...	½	91·27	44	1734	16·16	23·26	39·41
TOTAL ...			197·28	97	4108	19·92	22·47	42·35
Mymensingh ...	Nandail ...	1	125·80	127	6083	21·08	26·82	47·90
24–Parganas ...	Barasat ...	1	103·97	104	7992	43·04	33·81	76·85
TOTAL ...			229·77	231	14075	31·10	29·89	60·93
Rangpur ...	Pirgachha ...	2	99·61	201	10735	25·64	27·78	53·41
TOTAL ...		2	99·61	201	10735	25·64	27·78	53·41
Grand Total ...			526·66	529	28918	26·81	27·90	54·67

Mymensingh ...	Bajitpur ...	¼	70·47	17	1588	56·98	36·43	93·41
24–Parganas ...	Basirhat ...	¼	95·10	23	3489	104·67	47·03	151·70
Pabna ...	Pabna (Sadar)	¼	140·96	36	3503	55·47	41·84	97·31
TOTAL ...			306·53	76	8580	71·12	41·77	112·89
Pabna ...	Ullapara ...	½	159·51	83	10084	76·54	44·95	121·49
Rangpur ...	Rangpur ...	½	123·46	61	6765	72·08	38·82	110·90
TOTAL ...			282·97	144	16849	74 82	42·09	117·01
Mymensingh ...	Kishorganj ...	1	58·56	65	7652	75·34	42·38	117·72
Hooghly ...	Serampur ...	1	21·38	19	2264	78·65	40·51	119·16
Hooghly ...	Uttarpara ...	1	10·93	10	1463	98·02	48·28	146·30
TOTAL ...			90·87	94	11379	78·68	42·37	121·05
Grand Total ...			680·37	314	36808	75·00	42·18	117·22

TABLE 35

Equation for Graduation of Cost Values

Table (35·1). Cost of field survey in hours per Square Mile

Size of Grids	E = Enumeration	J = Journey	M = Miscellaneous
(1)	(2)	(3)	(4)
R.P.	$1{\cdot}5117+0{\cdot}0725\ (y)$	$1{\cdot}2386+0{\cdot}6099\ (\sqrt{y})$	$1{\cdot}4429+0{\cdot}0124\ (y)$
1	$0{\cdot}4775+0{\cdot}4344\ (y)$	$1{\cdot}1955+0{\cdot}7202\ (\sqrt{y})$	$0{\cdot}8413+0{\cdot}1745\ (y)$
4	$0{\cdot}2939+0{\cdot}6484\ (y)$	$1{\cdot}1955+0{\cdot}7202\ (\sqrt{y})$	$0{\cdot}8413+0{\cdot}1745\ (y)$
9	$0{\cdot}2914+0{\cdot}9891\ (y)$	$1{\cdot}1955+0{\cdot}7202\ (\sqrt{y})$	$0{\cdot}8413+0{\cdot}1745\ (y)$
16	$0{\cdot}2797+1{\cdot}1488\ (y)$	$1{\cdot}1955+0{\cdot}7202\ (\sqrt{y})$	$0{\cdot}8413+0{\cdot}1745\ (y)$
36	$0{\cdot}3392+1{\cdot}5156\ (y)$	$1{\cdot}1955+0{\cdot}7202\ (\sqrt{y})$	$0{\cdot}8413+0{\cdot}1745\ (y)$

TABLE (35·2).

Total Cost of Field Survey

Size of Grids	Hour per Sq. Mile	Rupees per Sq. Mile
(1)	(5)	(6)
R.P	$4{\cdot}1932+0{\cdot}6099\ (\sqrt{y})+0{\cdot}0849\ (y)$	$1{\cdot}5926+0{\cdot}2316\ (\sqrt{y})+0{\cdot}0322\ (y)$
1	$2{\cdot}5143+0{\cdot}7202\ (\sqrt{y})+0{\cdot}6089\ (y)$	$0{\cdot}9549+0{\cdot}2735\ (\sqrt{y})+0{\cdot}2313\ (y)$
4	$2{\cdot}3307+0{\cdot}7202\ (\sqrt{y})+0{\cdot}8229\ (y)$	$0{\cdot}8852+0{\cdot}2735\ (\sqrt{y})+0{\cdot}3125\ (y)$
9	$2{\cdot}3282+0{\cdot}7202\ (\sqrt{y})+1{\cdot}1636\ (y)$	$0{\cdot}8842+0{\cdot}2735\ (\sqrt{y}+0{\cdot}4419\ (y)$
16	$2.3165+0{\cdot}7202\ (\sqrt{y})+1{\cdot}3233\ (y)$	$0{\cdot}8798+0{\cdot}2735\ (\sqrt{y})+0{\cdot}5026\ (y)$
36	$2{\cdot}3760+0{\cdot}7202\ (\sqrt{y})+1{\cdot}6901\ (y)$	$0{\cdot}9024+0{\cdot}2735\ (\sqrt{y})+0{\cdot}6419\ (y)$

TABLE (35·3`

Total Cost in Rupees per Sq. Mile

Size of Grids	Statistical Work	Total Cost = Field plus Statistical
(1)	(7)	(8)
R.P.	0·0808 (y)	1·5926+0·2316 ($\sqrt{y}$)+0·1130 (y)
1	0·2686 (y)	0·9549+0·2735 ($\sqrt{y}$)+0·4999 (y)
4	0·5270 (y)	0·8852+0·2735 ($\sqrt{y}$)+0·8395 (y)
9	0·8343 (y)	0·8842+0·2735 ($\sqrt{y}$)+1·2762 (y)
16	1·2389 (y)	0·8798+0·2735 ($\sqrt{y}$)+1·7415 (y)
36	2.4773 (y)	0·9024+0·2735 ($\sqrt{y}$)+3·1192 (y)

TABLE 36.

Cost of Field Survey in Hours per Square Mile (1939): Observed and Graduated Values

Size of Grids (in Acres)	Density per sq. mile	Enumeration		Journey		Miscellaneous		Sub-total (2)–(4)		Total Field Cost	
		Observed	Graduated	Observed	Graduated	Observed	Graduated	Observed	Graduated	Observed	Graduated
(1·1)	(1·2)	(2·1)	(2·2)	(3·1)	(3·2)	(4·1)	(4·2)	(5·1)	(5·2)	(7·1)	(7·2)
Random Plots	4	1·44	1·80	2·04	2·46	1·89	1·49	5·37	5·75	17·58	17·47
	6	2·06	1·95	2·56	2·73	1·48	1·52	6·10	6·20	18·03	18·84
	9	2·31	2·16	3·63	3·07	1·20	1·55	7·14	6·79	19·55	20·63
	16	2·78	2·67	3·75	3·68	1·72	1·64	8·25	7·99	25·34	24·28
	25	3·51	3·32	3·98	4·29	1·66	1·75	9·15	9·37	26·61	28·47
	36	3·93	4·12	4·96	4·90	1·93	1·89	10·82	10·91	30·42	33·15

TABLE 36 – *Contd.*

Cost of Field Survey in Hours per Square Mile (1939): Observed and Graduated Values.

Size of Grids (in Acres)	Density per sq. mile	Enumeration		Journey		Miscellaneous		Sub-total (2)–(4)		Total Field Cost	
		Observed	Graduated	Observed	Graduated	Observed	Graduated	Observed	Graduated	Observed	Graduated
(1·1)	(1·2)	(2·1)	(2·2)	(3·1)	(3·2)	(4·1)	(4·2)	(5·1)	(5·2)	(7·1)	(7·2)
1—Acre	1	0·85	0·91	1·54	1·92	1·28	1·02	3·67	3·85	12·00	11·70
	2	1·43	1·35	1·83	2·21	1·15	1·19	4·41	4·75	14·44	14·43
	4	2·13	2·22	2·28	2·64	1·66	1·54	6·07	6·40	17·68	19·45
	6	3·22	3 08	2·65	2·96	1·55	1·89	7·42	7·93	21·92	24·10
	8	3·88	3·95	3·59	3·23	2·56	2·24	10·03	9·42	29·91	28·62

4—Acre	½	0·62	0·62	1·12	1·70	1·10	0·93	2·84	3·25	11·51	9·88
	1	0·96	0·94	1·82	1·92	1·16	1·02	3·94	3·88	13·13	11·79
	2	1·55	1·59	2·23	2·21	0·93	1·19	4·71	4·99	17·00	15·16
	3	2·26	2·24	1·95	2·44	0·93	1·36	5·14	6·04	15·29	18·35
9—Acre	½	0·72	0·79	1·67	1·70	1·00	0·93	3·39	3·42	10·81	10·39
	1	1·33	1·28	2·13	1·92	0·75	1·02	4·21	4·22	12·35	12·82
	2	2·20	2·27	2·51	2·21	1·87	1·19	6·58	5·67	21·38	17·23
	3	3·29	3·26	4·61	2·44	1·48	1·36	9·38	7·06	28·22	21·45
16—Acre	½	0·70	0·85	0·95	1·70	0·61	0·93	2·26	3·48	6·56	10·57
	1	1·66	1·43	2·53	1·92	1·72	1·02	5·91	4·37	19·87	13·28
	2	2·50	2·58	2·67	2·21	0·95	1·19	6·12	5·98	18·89	18·17
36—Acre	¼	0·83	0·72	1·23	1·56	0·89	0·88	2·95	3·16	10·09	9·60
	½	0·93	1·10	2·61	1·70	0·63	0·93	4·17	3·73	11·51	11·33
	1	1·91	1·85	1·76	1·92	0·97	1·02	4·64	4·79	15 31	14·55

TABLE 37.

Observed and Graduated Cost in Rupees per sq. Mile : 1938 and 1939

Size and Density of Grids	Statistical Work			Field Survey			Total 1939 Graduated
	1938 Estimated	1939		1938 Estimated	1939		
		Observed	Graduated		Observed	Graduated	
(1)	(2·1)	(2·2)	(2·3)	(3·1)	(3·2)	(3 3)	(4)
R.P. 4	0·56	0·37	0·32	1·28	2·20	2·18	2·50
6	0·82	0·53	0·48	1·86	2·25	2·35	2·83
9	1·22	0·76	0·73	1·91	2·44	2·58	3·31
16	1·98	1·26	1·29	2·46	3·17	3·04	4·33
25	...	1·99	2·02	...	3·33	3·56	5·58
36	...	2·85	2·91	...	3·80	4·14	7·05
1—acre 1	0·60	0·29	0·27	1·00	1·50	1·46	1·73
2	1·13	0·55	0·54	1·76	1·81	1 80	2·34
4	2·11	1·08	1·07	2·76	2·21	2·43	3·50
6	3·01	1·60	1 61	2·78	2·74	3·01	4·62
8	3·76	2·13	2·15	3·20	3·74	3·58	5·73

4—acre	½	...	0·28	0·26	...	1·44	1·23	1·49
	1	0·66	0·54	0·53	1·19	1·64	1·47	2·00
	2	1·28	1·05	1·05	2·16	2·13	1·89	2·94
	3	1·84	1·56	1·58	2·75	1·91	2·29	3·87
9—acre	½	...	0·44	0·42	...	1·35	1·30	1·72
	1	...	0·85	0·83	...	1·54	1·60	2·43
	2	...	1·67	1·67	...	2·67	2·15	3·82
	3	...	2·48	2·50	...	3·53	2·66	5·16
16—acre	½	...	0·64	0·62	...	0·82	1·32	1·94
	1	1·41	1·25	1·24	1·56	2·48	1·66	2·90
	2	2·70	2·46	2·48	2·68	2·36	2·27	4·75
36—acre	¼	...	0·64	0·62	...	1·26	1·20	1·82
	½	...	1·24	1·24	...	1·44	1·42	2·66
	1	...	2·46	2·48	...	1·91	1·82	4·30

TABLE—38

Cost per Sq. Mile for Different Levels of Error

Coefficient of Error	Cost in rupees per sq. mile					
	Random Plot	1–acre	4–acre	9–acre	16–acre	36–acre
(1)	(2)	(3)	(4)	(5)	(6)	(7)
100	1·9033	1·3168	1·2232	1·2378	1·2524	1·3592
90	1·9497	1·3808	1·2859	1·3063	1·3269	1·4546
80	2·0112	1·4673	1·3712	1·3998	1·4287	1·5868
70	2·0956	1·5896	1·4926	1·5337	1·5749	1·7775
62	2·1892	1·7286	1·6314	1·6879	1·7436	1·9981
60	2·2178	1·7718	1·6746	1·7358	1·7962	2·0674
58	2·2489	1·8189	1·7220	1·7883	1·8541	2·1436
56	2·2830	1·8708	1·7742	1·8466	1·9183	2·2279
54	2·3203	1·9282	1·8320	1·9112	1·9894	2·3214
52	2·3615	1·9923	1·8969	1·9833	2·0683	2·4257
50	2·4071	2·0631	1·9681	2·0633	2·1567	2·5423
48	2·4578	2·1428	2·0485	2·1536	2·2561	2·6740
46	2·5143	2·2322	2·1392	2·2550	2·3701	2·8224
44	2·5781	2·3334	2·2419	2·3703	2·4957	2·0890
42	2·6499	2·4489	2·3588	2·5020	2·6411	3·1842
40	2·7314	2·5816	2·4930	2·6531	2·8084	3·4075
38	2·8251	2·7329	2·6480	2·8277	3·0019	3·6639
36	2·9327	2·9095	2·8286	3 0316	3·2275	3·9669
34	3·0575	3·1168	3·0408	3·2714	3·4934	4·3080

TABLE 38—*Contd.*

Coefficient of Error	Cost in rupees per sq. mile					
	Random Plot	1-acre	4-acre	9-acre	16-acre	36-acre
(1)	(2)	(3)	(4)	(5)	(6)	(7)
32	3·2049	3·3628	3·2924	3·5562	3·8094	4·7422
30	3·3795	3·6565	3·5944	3·8985	4·1897	5·2508
28	3·5896	4·0136	3·9602	4·3142	4·6523	5·8697
26	3 8448	4·4508	4·41 :9	4·8272	5·2229	6·6365
24	4·1613	4·9987	4·9780	5·4713	5·9396	7·5989
22	4·5625	5·6997	5·6988	6·2934	6·8575	8·8337
20	5·0778	6·6097	6·6431	7·3723	8·0582	10·4525
18	5·7638	7·8345	7·9122	8·8219	9.6763	12·6330

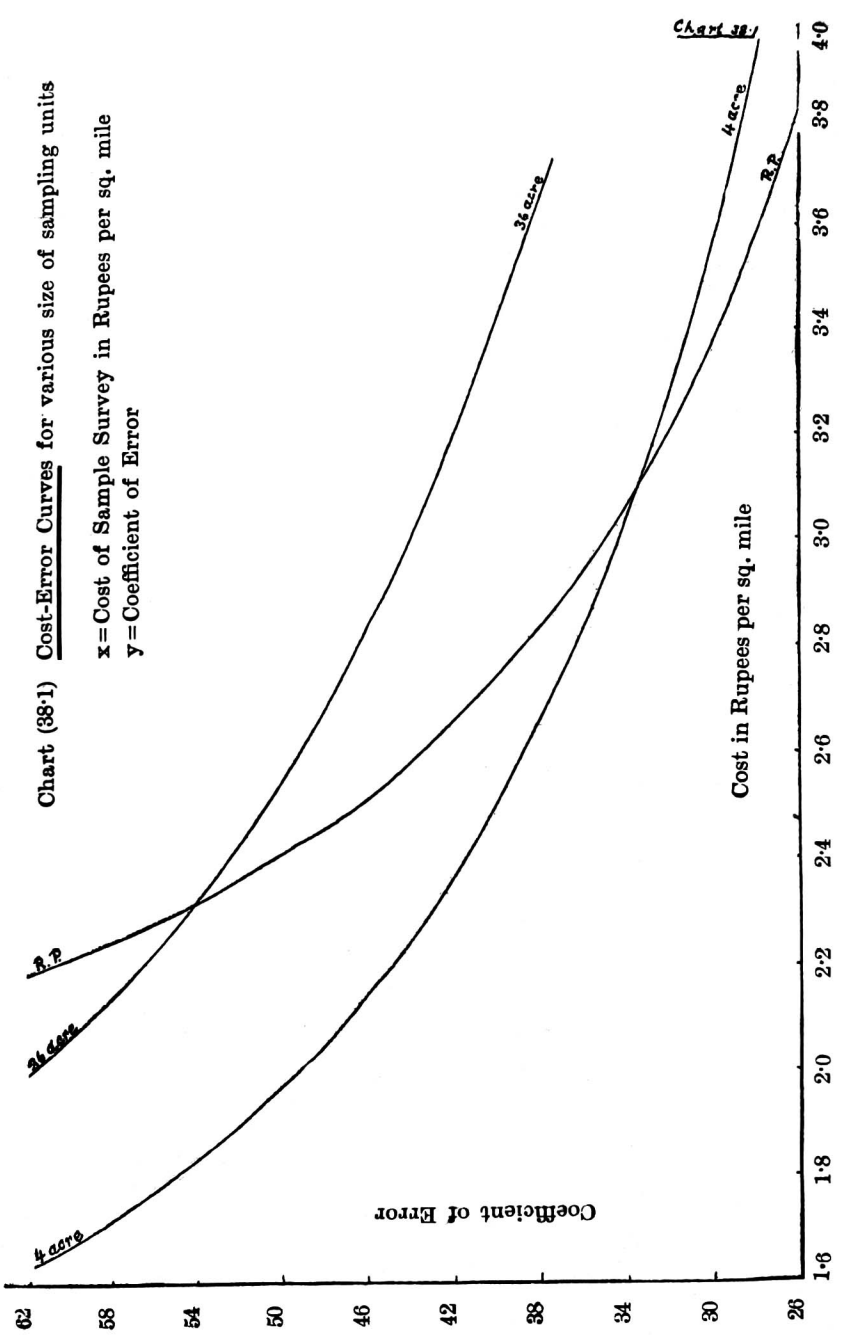
Chart (38·1) Cost-Error Curves for various size of sampling units
x = Cost of Sample Survey in Rupees per sq. mile
y = Coefficient of Error
Coefficient of Error
Cost in Rupees per sq. mile
62
58
54
50
46
42
38
34
30
26
1·6
1·8
2·0
2·2
2·4
2·6
2·8
3·0
3·2
3·4
3·6
3·8
4·0
4 acre
24 acre
R.P
Chart 38·1
4 acre
24 acre
R.P

APPENDIX II.

NOTE BY THE SECRETARY ON SUBJECT NO. 2.—*To consider the report by Prof. P. C. Mahalanobis on the Statistical work on the random sampling experiments on the 1939 crop.*

A copy of the report (Appendix I) has already been circulated to the members of the Jute Census Committee. Enclosed is a note by Mr. P. N. Sen containing his remarks on the report. (*Enclosure.*)

2. Prof. Mahalanobis's conclusion on the basis of the work in 1939 are summarised in para 108 of his report. The Committee can feel satisfied with the substantial progress made this year. In Section 7 of the report (Paras. 109-125) are contained various important points in regard to the programme of work for 1940 which require consideration by the Committee.

3. In regard to the decision of the Jute Census Committee at its sixth meeting not to carry out any complete enumeration (except, as suggested by Prof. Mahalanobis, possibly in one or two small areas) in the work of the coming season, it is realised that the Government of Bengal may not introduce regulation of the 1940 crop and that therefore no figures may be available from the Government of Bengal regarding the 1940 acreage actually sown to jute.

It is felt however that the course decided on is the best that could be taken in the circumstances and would ensure the expenditure of the funds available in the best possible way. Complete enmeration can not be taken as a final basis for checking as it must itself be subject to errors depending on the human factor, and it is known that these errors may easily be of a large order. As it is somewhat problematical what number of trained staff will be available to the Jute Census Committee for the work on the 1940 crop the accuracy of complete enumeration, if it were attempted, is also problematical. It is hoped, however, that sufficient trained staff will be available to ensure that the random sampling in the eight selected districts proceeds satisfactorily.

The half-sample method suggested by Prof. Mahalanobis appears to meet the case in the best possible way under the circumstances. It is also clear that model sampling methods in the Laboratory can be used to check the errors inherent in various random sampling procedures, apart from errors dependent on the human factor, so that, with this limitation, further complete enumeration in the field is perhaps not essential as far as checking and comparing the suitability of various random sampling methods is concerned. The programme decided on for the 1940 crop should give the desired information regarding design and costs and the half-sample method should enable satisfactory checking to be done.

4. The question of supply of maps raised in para 125 of the report deserves special consideration. It may be added for the information of the Committee that on the previous occasion Mr. Carter (then Director of Land Records and Surveys, Bengal) approached the Board of Revenue, Bengal, on behalf of the Jute Census Committee to supply the maps *free of charge* but the Provincial Government did not agree.

5. It is very gratifying to note that the Government of Bengal have now intimated that it has been proposed by that Government to provide a sum of Rs. 62,500 in the next year's budget for random sampling survey of jute to be undertaken by the Indian Central Jute Committee.

6. The subject is for the consideration of the Jute Census Committee.

ENCLOSURE.

Copy of letter received from Mr. P. N. Sen, by the Secretary, Indian Central Jute Committee.

"As regards the Report of Prof. Mahalanobis on the sample census of jute in 1939, I would make the following submissions and would request you to circulate them among the members of the Jute Census Committee.

"This is the Report on the third exploratory survey and it is stated definite and satisfactory conclusions have been reached with regard to the best sizes of grids as well as the density of grids and their bearing on the cost of the survey. There is however one point on which, it appears to me, nothing is mentioned in this final report on exploratory survey. I am referring to the *size of zones* which has an important bearing on the accuracy of the survey as well as its cost. There was only a very short discussion on this point at one of the earlier meetings beyond which no statistics seem to have been collected or any analysis made from the point of view of ascertaining the best sizes of zones in areas of different density.

"In the face of the very well known fact that the distribution of cultivation of jute is very uneven, I submit no survey would be even fairly correct unless the point as to the size of the zone has been fully explored.

"I would therefore suggest that the question should be fully explored before complete survey of any district is taken in hand as is proposed in 1940. A very great step towards solving the problem would be to obtain the views of Prof. Hotelling who is coming to India this winter and for whose advice it has been decided to spend a good amount of money. Any member who wishes it should be given an opportunity to meet Prof. Hotelling and discuss the above or any other point.

"Looking at the question from the practical point of view I consider that if the complete sample survey of the eight districts are taken in hand without proper determination of the size of zones the results would be extremely undependable. A fair amount of accuracy has been obtained up to now because zones have been limited to thanas where the cultivation is more or less homegeneous. If all the thanas of the same district and the major portion of the jute area (as would be comprised by eight leading jute districts) are taken up, I am afraid the same conclusions regarding the size and density of grids would not certainly be correct.

"The above point is for the consideration first of the Jute Census Committee."

APPENDIX III.

SUPPLEMENTARY NOTE NO. 1 BY THE SECRETARY ON SUBJECT NO. 2.—*To consider the report of Prof. P. C. Mahalanobis on the Statistical work on the random sampling experiments on the 1939 crop.*

The following comments by Prof. P. C. Mahalanobis on Mr. P. N. Sen's note are circulated for consideration :—

"The point raised by Mr. P. N. Sen regarding the size of zones is of fundamental importance. I have already explained in previous reports and notes that, from the statistical point of view, it is desirable to divide the whole Province into a number of zones each of which will be as homogeneous as possible in regard to the intensity of cultivation, that is, the proportion of land under jute will be as nearly constant as possible in each zone. Mr. P. N. Sen is quite right in stating that—

> "there was only a very short discussion on this point at one of the earlier meetings beyond which no statistics seemed to have been collected or any analysis made from the point of view of ascertaining the best size of zones in areas of different densities"

The only way, however, in which the best size of zones can be settled is by gathering detailed information regarding the intensity of cultivation; and one of the chief objects of the proposed survey in 1940 is to gather this very information for different thanas and unions. In fact until this information becomes available it is quite impossible to take up the question of the best size of zones."

APPENDIX IV.

SUPPLEMENTARY NOTE NO. II ON SUBJECT NO. 2.

Attached for the consideration of the Jute Census Committee is a note dated the 10th December, 1939 by Prof. Mahalanobis on the financial position of the Jute Census Survey in 1940. (*Enclosure.*)

2. In regard to the statement of the "amounts available" contained in para. 2 of Prof. Mahalanobis's note, Secretary wishes to make clear that in its budget for 1940-41 submitted to the Government of India the Indian Central Jute Committee have only provided Rs. 62,500 for Jute Census Scheme. It may, however, be

possible to find an additional amount of say Rs. 5,000 to Rs. 6,000 for this work from the Indian Central Jute Committee funds with the sanction of the Government of India. The sum of Rs. 14,000 on account of the equivalent value of services of the Committee's District Agricultural staff is based on the last year's actuals. It is hoped the Government of Bengal will agree to the utilization of the Committee's District Agricultural Staff for the Jute Census work for 3 months during 1940 as was done in 1939.

3. For the information of the Committee it may be explained that items No. (3) in para. 4 of Prof. Mahalanobis's note consists of—

(*i*)	Allowance to the Statistical Adviser @ Rs. 5,00/- p.m. ...	... Rs. 6,000/-
(*ii*)	Pay of the Temporary Lecturer to relieve Prof. Mahalanobis @ Rs. 125/- p.m. ...	... „ 1,500/-
(*iii*)	Miscellaneous T. A. Etc.	... „ 500/-
		Rs. 8,000/-

4. A detailed budget for the Field work and statistical work in 1940 together with proposals for supervision, etc., will be placed before the Jute Census Committee in due course. For the Statistical part of the Scheme it is suggested that the procedure of giving a block grant to the Indian Statistical Institute may be continued as proposed under subject No. 4.

ENCLOSURE

Note dated the 10th December 1939 by Prof. P. C. Mahalanobis.

In view of the fact that the Government of Bengal have kindly sanctioned their full contribution of the scheme for the sample census in jute in 1940 I am proceeding with the preparation of the sample units for 8 districts as settled at the meeting of the Jute Census Committee held on the 10th October 1939. I am intentionally using a slightly higher density of grids in order to prevent any wastage of man-power on the field.

2. I am giving below a brief statement of the present financial position. Rs. 25,000 has been already set apart for preparatory work for the 1940 scheme; and Rs. 62,500 has been contributed by the Government of Bengal for the financial year 1940-41. Mr. Cliff in his note on item No. 35 of the agenda for the meeting of the Indian Central Jute Committee held in July 1938 stated on page 2 that 'if considered desirable, it is thought that up to Rs. 80,000 can be made available for work in 1940-41' (out of, of course, the funds of the Inndian Central Jute Committee). I understand that it will be possible to provide, say, Rs. 68,500 out of Committee's funds in 1940-41. Finally, there is the equivalent money-value of Rs. 14,000 for the services of the district agricultural staff for jute. On this basis the total amount available from now up to 31st March 1941 will be Rs. 1,70,000 as shown below.

(1) Already available for preparatory work ...	Rs.	25,000
(2) Contribution from Government of Bengal (1940-41)	Rs.	62,500
(3) Contribution from Indian Central Jute Committee	Rs.	68,500
(4) Enquivalent value of services of agricultural staff	Rs.	14,000
	Rs.	1,70,000

3. I propose that Rs. 40,000 should be provided for preparatory work for the sample census in 1941. This leaves us Rs. 1,30,000 for the current scheme. I have suggested that it will be desirable to provide about Rs. 5,000 for model sampling experiments on the lines recommended in my report on the Crop Census on 1939. I have also proposed that the work of area extraction of the jute plots should be transferred to the Statistical Laboratory to facilitate the final tabulation and checking of the results; Rs. 7,000 will be required for this purpose.

4. On this basis the budget for the current scheme (inclusive of all expenses comes out as follows:—

(1) Maps (estimated)	Rs.	17,000
(2) Area extraction	,,	7,000
(3) Overhead	,,	8,000
(4) Model Sampling experiments	,,	5,000
	Rs.	37,000
(5) Sample Census in 1940	,,	93,000
Total	Rs.	1.30,000

5. In accordance with my provisional estimates submitted on the 1st October, 1939 (printed on page 13 of the Proceedings of the Jute Census Committee held on the 10th October 1939) the distribution would be roughly Rs. 24,000 for the statistical and Rs. 69,000 for the field portions of the scheme. I am, however, cutting down the cost of the statistical work by Rs. 1,000 in order to allow a little more money for the field work. On this basis the actual distribution comes out as follows:—

(A) *Secretary, Jute Census Committee.*

(1) Maps	Rs.	17,000
(2) Field Work	,,	70,000
(3) Overhead	,,	8,000
	Rs.	95,000

(B) *Block grant to the Indian Statistical Institute.*

(1) Statistical work	Rs.	23,000
(2) Area extraction	,,	7,000
(3) Model sampling experiments ...	,,	5,000
	Rs.	35,000
Grand Total	Rs.	1,30,000

6. I may add a few words regarding the financial provision for the sample census in 1941. We are providing Rs. 40,000 for preparatory work in the budget for 1940-41. There will be one lac of rupees left in the hands of the Indian Central Jute Committee; there is also Rs. 14,000 the money value of the services of the agricultural staff. We have every reason to hope that the Government

of Bengal will continue their contribution of Rs. 62,500. The total amount available for 1941-42 will therefore be Rs. 2,16,500 shown below:—

(1) Preparatory work to be provided in budget for 1940-41	Rs.	40,000
(2) Contribution from Indian Central Jute Committee	,,	1,00,000
(3) Contribution from the Government of Bengal (1941-42)	,,	62,500
(4) Services of the agricultural staff ...	,,	14,000
	Rs.	2,16,500

As far as I can see at present this should suffice for a full scale provincial sample census in 1941.

(Sd.) P. C. MAHALANOBIS.

APPENDIX V.

NOTE BY THE SECRETARY ON SUBJECT NO. 3.—*To consider the progress so far made in the preparatory field work for the 1940 survey.*

The Jute Census Committee at its last meeting held on 10th October, 1939 agreed that the preparatory field work for survey in 1940 should be proceeded with in eight districts *viz.* 1. Mymensingh; 2. Dacca; 3. Rangpur; 4. Tipperah; 5. Bogra; 6. Rajshahi; 7. Jessore and 8. Nadia and also approved the appointment of one Chief Inspector, one Inspector and six workers. The staff was set to work in the middle of October and their immediate task was to collect two sets of cadastral maps from the Collectorates and send them to the Statistical Laboratory for the preparation of the sample units for the survey. The Collectors have been requested to supply the maps @ -/1/6 each sheet and the cost will be paid by the Committee in Calcutta as was done last year. The work of procuring the maps is enormous but it is expected that it will be completed by the beginning of next month and by then all the cadastral maps will have reached the statistical Laboratory.

2. The Committee's staff has been asked to collect the following information as far as possible:—

(*a*) ascertaining the exact weeks by which sowing is completed and harvesting is commenced in the different areas;

(*b*) getting full knowledge of the nature of area and communications, and arranging for the centres and camps, from which the workers would work;

(*c*) ascertaining the area covered by beels, chars, marshes and forests, where no jute is ever grown;

(*d*) ascertaining the riparian areas where the configuration of fields has so widely changed that the cadastral maps would be useless for plot identification;

(*e*) ascertaining the types of local recruits that would be available for our work;

(*f*) obtaining the co-operation of the local officers; the Union Board Presidents and Members and other non-official leaders;

(*g*) purchasing of cadastral maps and transmission of one set to the Laboratory for the Laboratory work;

(*h*) reporting the administrative divisions of the villages of each thana under the different Municipalities and Union Boards, and

(*i*) other necessary informatoin for the organisation of the field work.

3. The Government of Bengal was requested to authorise the Director of Land Records and Surveys, Bengal and his officers to furnish the information collected by the "Jute Registration Staff" to the Committee's staff wherever required by them. It is understood the Provincial Government have kindly issued the necessary instruction.

4. The Committee's Motor Launch "Lord Linlithgow" has been placed at the disposal of the Chief Inspector to finish the work in the *Char areas* from North east of Rangpur to Chandpur and also along Dhakeswari and minor rivers. For the Indian Central Jute Committee's "scheme of enumeration of jute passing from Assam to Bengal" a launch has been hired at a cost of Rs. 378 p.m. The cost of hire of this launch and running expenses of "Lord Linlithgow" *viz.* Rs. 350 p.m. will be charged to the Jute Census Scheme. The hired launch was engaged from 3rd Navember 1939 and it is expected to be used till the 20th January 1940.

5. From the reports which are being received from the Chief Inspector it appears that the work of the collection of preliminary information is being pushed on steadily and the progress so far beeu quite satisfactory.

6. The subject is for the information of the Jute Census Committee.

APPENDIX VI.

NOTE BY THE SECRETARY ON SUBJECT NO. 4.—*To consider a proposal to give lump grant to the Indian Statistical Institute for expenditure in connection with the work on the satistical side of the Jute Census work in 1940.*

At its meeting held in February, 1939 the Indian Central Jute Committee decided that in connection with the Statistical work of 1939 surveys the estimated cost to cover salaries, allowances and contingencies be paid to the Indian Statistical Institute in the form of a *lump sum grant* and the Institute be required to furnish a formal Auditor's Certificate of expenditure and refund to the Committee

any unspent balance. This procedure was sanctioned only for 1939 work but in anticipation of the Committee's approval a sum of Rs. 5,000 has been advanced to the Indian Statistical Institute as a lump sum grant to meet a part of the expenditure in connection with the preparatory work on the statistical side of the Jute Census Work in 1940. It is for the consideration of the Jute Census Committee whether the procedure of making *lump sum grants* to the Institute be continued for 1940 work on the same conditions as were imposed in 1939.

APPENDIX VII.

NOTE BY THE SECRETARY ON SUBJECT NO. 5.—*To consider a proposal to grant a Special pay of Rs. 25 p.m. to the Senior Assistant, Indian Central Jute Committee for doing additional work in connection with the Jute Census Scheme.*

The Jute Census Committee at its last meeting held on the 10th October, 1939, decided that the Field work of the Jute Census Scheme should be carried out under the supervision of the Secretary, Indian Central Jute Committee. As a result of this decision considerable additional work has been thrown on the Senior Assistant (Mr. V. N. Kohli) and he has represented that he may be given some Special pay for extra work. When the Field work was being done under the supervision of the Director of Land Records and Surveys, Bengal, a special allowance of Rs. 25 p.m. was sanctioned on the suggestion of the Government of Bengal for the clerk who was doing the work in the office of the Director of Land Records and Surveys.

Secretary recommends that the same amount should be granted as Special Pay to the Senior Assistant so long as the Jute Census work is being done under the supervision of the Secretary. This may take effect from the 10th October when the work actually started.

The subject is for the consideration of the Jute Census Committee.

APPENDIX VIII.

NOTE BY THE SECRETARY ON SUBJECT NO. 6.—*To consider points which might suitably be discussed with Prof. Hotelling during his visits to Calcutta.*

At its last meeting held in July 1939, the Indian Central Jute Committee decided to contribute a sum of Rs. 1,500 to the Indian Statistical Institute towards the expenses of Prof. Harold Hotelling's visit to India. In return for this contribution the Committee was to get the advice of the Professor on its Statistical and Economics research and enquiry work generally, and particularly its work on the improvement of the Jute Forecast.

2. The Secretary of the Indian Statistical Institute has been informed that Prof. Hotelling is expected to reach Calcutta about the 11th December, 1939 and halt here till the 22nd or 23rd December. He will probably visit Madras and other places in South India during the Christmas holidays and the first fortnight of January 1940 and will be back in Calcutta by the middle of January and halt here till the first week of February, 1940.

3. It is proposed to hand over to Prof. Hotelling a note with necessary papers indicating the points on which his advice is required. He can then study those questions and discuss them with the Secretary, Senior Marketing Officer and the Assistant Economics Officer in January. So far as the Jute Census work is concerned he will be handed over all the reports so far available and will be requested for an impartial and critical review on the work so far done.

4. It is for the consideration of the Committee whether a meeting should be arranged in January when Prof. Hotelling can meet the members of the Jute Census Committee.

5. Secretary would be glad to have the advice of members regarding any specific points they wish to be referred to Prof. Hotelling.