

PILOT PROJECT IN WATERSHED MANAGEMENT ON THE NAHAL SHIKMA

I S R A E L

Volume III

LAND AND WATER USE

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APPENDIX A 3. - BARLEY YIELD (VARIETY GLAZIER) RELATED TO RAINFALL
IN EXPERIMENTAL STATION D'VIV (1955 - 59)

Table I.

Rainfall in mm	Yield in Kg	Kg of barley per cu m of water	Price of 1 kg of grain in agurot
223	73	0.327	30.8
238	95	0.399	23.6
339	183	0.539	12.2
481	321	0.667	7.0
Average 320	168	0.482	1.84

Note : It costs IL 22.50 to produce 1 dunam of barley, after deducting the cost of bailing the straw.

APPENDIX A 3. - BARLEY YIELD (VARIETY GLAZIER) RELATED TO RAINFALL
AT EXPERIMENTAL STATION GAT (1950 - 1962)

Table II.

Rainfall in mm	Yield in kg	Kg of yield per 1 cu m of water	Price of 1 kg of grain in agurot
264	112	0.424	20.0
277	60	0.215	37.5
283	235	0.830	9.5
356	350	0.983	6.4
361	388	1.074	5.8
385	202	0.524	11.1
429	210	0.489	10.7
443	280	0.632	8.0
550	178	0.323	13.2
555	222	0.400	10.1
588	130	0.221	17.1
603	217	0.360	10.3
Average 424	215	0.538	13.3

Note : It costs IL 22.50 to produce one dunam of barley after deducting the costs of bailing straw.

APPENDIX A 4. - BARLEY YIELDS RELATED TO RAINFALL IN NEGEV

Table I.

Serial No.	Year	Rainfall (mm)	Yield/dunam (kg)	Yield/m ³ water (kg)	Production cost/kg grain	Return dunam 1/	Profit/dunam
1	1960	139	0	0	0	0	0
2	1958	140	10	0.071	2.961	2.50	-27.611
3	1958	147	33	0.224	0.862	8.25	-21.861
4	1958	150	70	0.466	0.380	17.50	-12.611
5	1959	169	80	0.475	0.326	20.-	-10.111
6	1958	170	110	0.647	0.223	27.50	- 2.611
7	1959	172	46	0.267	0.604	11.50	-18.611
8	1958	177	35	0.198	0.810	8.75	-21.361
9	1958	186	57	0.306	0.478	14.29	-15.861
10	1960	186	0	0	0	0	
11	1958	190	85	0.447	0.304	21.25	- 8.861
12	1958	190	140	0.736	1.165	35.-	+ 4.889
13	1959	200	20	0.100	1.455	5.-	-25.111
14	1959	202	30	0.148	0.953	7.50	-22.611
15	1958	217	110	0.507	0.223	27.50	- 2.611
16	1959	220	0	0	0	0	
17	1958	223	100	0.448	0.251	25.-	- 6.111
18	1958	223	65	0.244	0.413	16.25	-13.861
19	1958	226	0	0	0	0	
20	1958	226	30	0.132	0.953	7.50	-22.611
21	1959	238	60	0.252	0.451	15.-	-15.111

Note : 1 dunam barley costs IL 30.11

1/ 1 Kg straw (at 5 ag) for each 1 Kg grain (at 20 ag)

APPENDIX A 4. - BARLEY YIELDS RELATED TO RAINFALL IN NEGEV

Table I (Cont'd)

Serial No.	Year	Rainfall (mm)	Yield/dunam (kg)	Yield/m ³ water (kg)	Production cost/kg grain	Return dunam 1/	Profit/dunam
22	1959	239	25	0.104	1.154	6.25	-23.861
23	1959	244	45	0.184	0.619	11.75	-18.861
24	1958	250	120	0.480	0.200	30.-	- 0.111
25	1961	257	130	0.505	0.181	32.50	+ 2.389
26	1961	276	95	0.344	0.226	23.75	- 6.361
27	1961	276	180	0.652	0.117	45.-	+14.889
28	1961	289	59	0.204	0.460	14.75	-15.361
29	1961	290	94	0.324	0.270	23.50	- 6.611
30	1961	305	110	0.360	0.223	27.50	- 2.611
31	1961	305	147	0.481	0.547	36.75	+ 6.639
32	1961	307	100	0.325	0.251	25.-	- 6.111
33	1961	307	110	0.358	0.223	27.50	- 2.611
34	1961	322	135	0.419	0.173	33.75	+ 3.639
35	1958	323	181	0.560	0.116	45.25	+15.139
36	1961	324	94	0.290	0.270	23.50	- 6.611
37	1958	348	170	0.494	0.127	42.50	+12.389
38	1961	353	154	0.436	0.145	38.50	+ 8.389
39	1961	378	155	0.410	0.144	38.75	+ 8.639
40	1959	380	178	0.468	0.119	44.50	+14.389
41	1959	380	224	0.589	0.084	56.-	+25.889
42	1959	382	228	0.597	0.082	57.-	+26.889
43	1961	394	91	0.233	0.280	22.75	- 7.360
	Average	254	90	0.331			

1/ 1 Kg straw (at 5 ag) for each 1 Kg grain (at 20 ag)

APPENDIX A 4. - WHEAT YIELDS RELATED TO RAINFALL IN NEGEV

Table II.

Serial No.	Year	Rainfall (mm)	Yield/dunam (kg)	Yield/m ³ water (kg)	Production cost/kg grain	Return dunam ^{1/}	Profit/dunam
1	1958	130	35	0.269	0.946	8.750	-21.561
2	1960	139	7	0.050	4.254	1.750	-28.561
3	1958	140	0	0	0	0	
4	1958	147	48	0.326	0.583	12.000	-18.311
5	1958	150	60	0.400	0.451	15.000	15.311
6	1959	172	0	0	0	0	0
7	1959	174	0	0	0	0	
8	1959	186	0	131	0		
9	1958	190	100	0.526	0.251	25.000	- 5.311
10	1959	200	40	0.200	0.703	10.000	-20.311
11	1960	206	0	0	0	0	
12	1958	210	97	0.461	0.260	24.250	- 6.061
13	1958	210	120	0.571	0.201	30.000	- 0.311
14	1958	217	62	0.285	0.435	15.500	-14.811
15	1958	223	97	0.430	0.260	24.250	- 6.061
16	1958	223	100	0.448	0.251	25.000	- 6.311
17	1959	226	108	0.477	0.229	27.000	- 4.311
18	1958	226	60	0.265	0.452	15.000	-15.311
19	1958	230	90	0.391	0.284	22.500	- 2.611
20	1959	23	60	0.252	0.451	15.000	-15.311
21	1959	239	40	0.167	0.703	10.000	-20.311

^{1/} 1 dunam wheat costs IL 30.31: 1 Kg straw (at 5 ag) for each 1 Kg grain (at 20 ag)

APPENDIX A 4. - BARLEY YIELDS RELATED TO RAINFALL IN NEGEV

Table II (Cont'd)

Serial No.	Year	Rainfall (mm)	Yield/dunam (kg)	Yield/m ³ water (kg)	Production cost/kg grain	Return dunam 1/	Profit/dunam
22	1958	250	60	0.240	0.451	15.000	-15.311
23	1959	257	60	0.233	0.451	15.000	-15.311
24	1961	276	105	0.380	0.236	26.250	- 4.060
25	1958	284	80	0.309	0.292	22.000	- 8.311
26	1961	290	70	0.241	0.380		
27	1961	305	69	0.226	0.386	17.500	-12.811
28	1961	307	65	0.205	0.428	17.250	-13.061
29	1958	323	175	0.541	0.122	15.750	-14.561
30	1958	348	241	0.692	0.075	43.750	+13.439
31	1961	353	85	0.240	0.304	21.250	- 9.061
32	1959	354	110	0.310	0.225	27.500	- 2.811
33	1961	356	118	0.331	0.205	29.500	- 0.811
34	1961	378	134	0.354	0.174	33.300	+ 2.989
35	1961	378	126	0.333	0.188	31.500	+ 1.189
36	1959	380	140	0.368	0.165	35.000	+ 4.689
37	1959	382	117	0.306	0.207	29.250	- 1.061
38	1959	382	155	0.400	0.146	38.250	+ 7.939
39	1961	394	63	0.159	0.428	15.750	-14.561
	Average	258	79	0.300			

1/ 1 dunam wheat costs IL 30.31: 1 Kg straw (at 5 ag) for each 1 Kg grain (at 20 ag)

APPENDIX A 4. - HAY YIELDS RELATED TO RAINFALL IN NEGEV

Table III

Serial No.	Year	Rainfall (mm)	Yield per dunam (Kg)	Yield /m ³ water (Kg)	Production cost/Kg (IL)
1	1960	139	0	0	-
2	1960	170	0	0	-
3	1960	206	307	1.490	0.099
4	1960	243	156	0.642	0.196
5	1960	276	215	0.779	0.142
6	1960	279	208	0.745	0.147
7	1960	290	152	0.524	0.201
8	1960	305	100	0.327	0.306
9	1960	307	330	1.074	0.092
10	1960	307	171	0.557	0.179
11	1960	318	186	0.584	0.164
12	1960	323	279	0.863	0.109
13	1960	348	188	0.540	0.163
14	1960	378	308	0.814	0.099
15	1960	380	153	0.402	0.200
16	1960	381	280	0.734	0.109
17	1960	382	232	0.603	0.132
18	1960	406	251	0.618	0.122
19	1960	406	313	0.770	0.097
20	1960	406	381	0.938	0.080
21	1960	491	258	0.525	0.118
22	1960	499	325	0.651	0.094
Average	1960	329	217	0.709	

Note : 1 dunam hay costs IL 30.64

APPENDIX A 4. - SORGHUM YIELDS RELATED TO RAINFALL IN NEGEV

Table IV.

Serial No.	Rainfall (mm)	Yield (Kg)	Yield/ m ³ water (Kg)	Production cost/K _ℓ	Return/ dunam ^{1/}	Net Profit
1	170	0	0		0	- 20.776
2	243	0	0		0	- 20.776
3	279	0	0		0	- 20.776
4	290	130	0.448	0.199	26.00	+ 0.119
5	305	100	0.324	0.258	20.00	- 5.881
6	307	48	0.156	0.539	9.60	- 16.281
7	318	116	0.364	0.223	23.30	- 2.681
8	348	250	0.717	0.103	50.00	+ 24.119
9	353	156	0.470	0.165	31.20	+ 5.319
10	354	134	0.378	0.193	28.60	+ 2.719
11	356	143	0.401	0.180	51.00	+ 25.119
12	356	255	0.716	0.101	17.20	- 8.681
13	378	86	0.227	0.300	14.00	- 22.881
14	381	70	0.183	0.369	22.00	- 3.881
15	382	110	0.287	0.235		
16	382	179	0.468	0.144	35.80	+ 9.919
17	390	318	0.815	0.081	63.60	+ 37.719
18	394	128	0.324	0.202	25.60	- 0.281
19	420	170	0.404	0.152	34.00	+ 8.119
20	491	147	0.299	0.176	29.40	+ 3.519
21	499	70	0.140	0.369	14.00	- 11.881
Average	336	118	0.374	0.221		

^{1/} at 20 agurot per kg

App. A4

Yields of Barley for Different Rainfalls

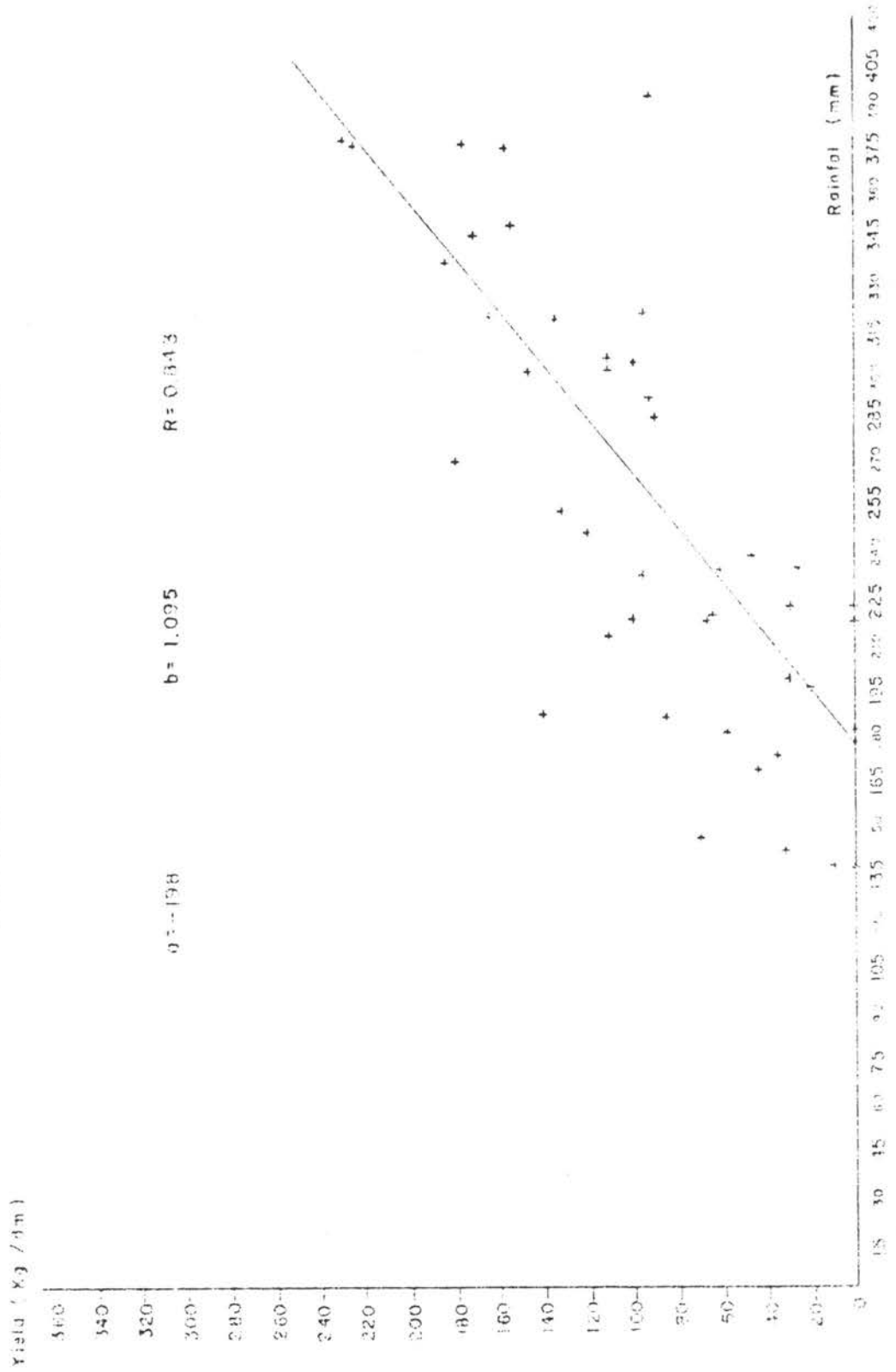


Fig. 2

App A4
Yields of Wheat for Different Rainfalls

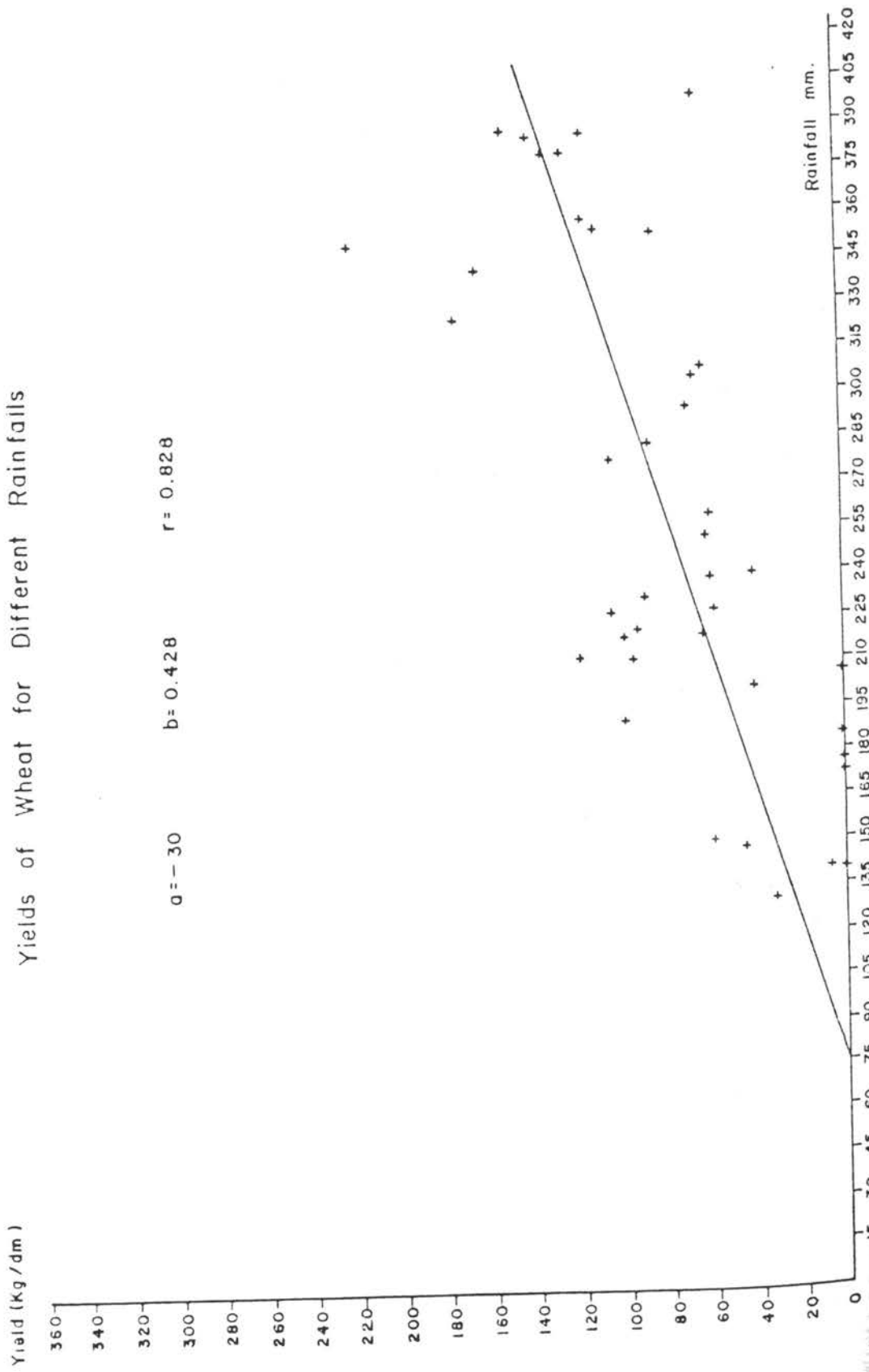
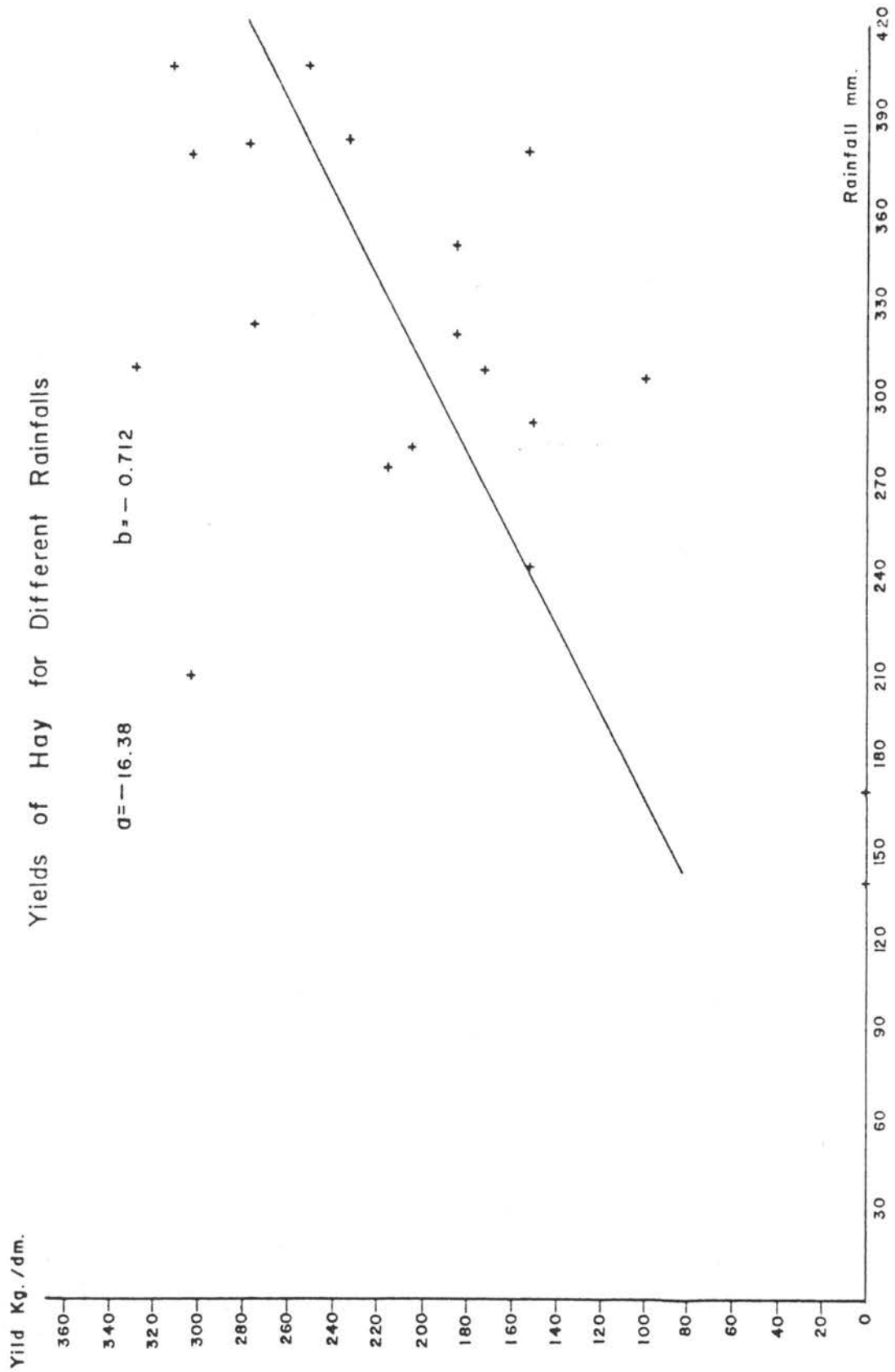


Fig. 3

App. A4



APPENDIX A 5 - PROFIT PROBABILITY IN RELATION TO RAINFALL
IN DRY-LAND FARMING IN 3 REGIONS

Table I.

Shuval region

mm of rainfall		Barley	Hay (IL)	Wheat	Sorghum
1	90	- 30.-	- 25.20	- 25.-	- 10
2	100	- 30.-	- 26.40	- 24.20	- 10
3	160	- 30.-	- 19.20	- 20.30	- 10
4	190	- 27.50	- 15.-	- 18.40	- 10
5	220	- 19.-	- 10.80	- 16.30	- 10
6	220	- 19.-	- 10.80	- 16.30	- 10
7	230	- 17.-	- 9.60	- 15.60	- 10
8	260	- 8.50	- 6.-	- 13.30	- 10
9	260	- 8.50	- 6.-	- 13.30	- 10
10	300	+ 2.50	- 0.60	- 10.60	0
11	310	+ 6.-	+ 0.60	- 9.90	+ 1.40
12	330	+ 11.-	+ 3.-	- 8.40	+ 4.20
13	360	+ 19.-	+ 7.20	- 6.40	+ 8.40
14	360	+ 19.-	+ 7.20	- 6.40	+ 8.40
15	430	+ 38.-	+ 16.20	- 1.10	+ 18.20
Loss (total)		-189.50	-129.60	-204.50	- 90.00
Profit (total)		+ 95.50	+ 34.20	0	+ 40.60
Profit		- 94.00	- 95.40	-204.50	- 49.40
Profit per season		- 6.26	- 6.36	- 13.63	- 3.29
% of years of loss		60	66.5	100	6.5
% of years of profit		40	33.5	0	33.5

APPENDIX A 5 - PROFIT PROBABILITY IN RELATION TO RAINFALL
IN DRY-LAND FARMING IN 3 REGIONS

Table II.

Ruhama region

	Mm of rainfall	Barley	Wheat	Hay	Sorghum
1	114	- 30.0	(IL) - 25.20	- 23.60	- 10.-
2	160	- 30.-	- 19.20	- 20.30	- 10.-
3	204	- 25.-	- 13.50	- 17.70	- 10.-
4	248	- 10.-	- 7.20	- 14.10	- 10.-
5	270	- 5.50	- 4.80	- 12.60	- 10.-
6	279	- 2.50	- 3.30	- 11.90	- 10.-
7	305	+ 2.50	- 1.35	- 10.60	0
8	318	+ 8.50	- 1.80	- 9.10	+ 2.80
9	329	+ 11.-	- 3.-	- 8.40	+ 4.20
10	338	+ 14.-	- 4.50	- 7.70	+ 5.60
11	381	+ 26.-	+ 9.60	- 4.90	+ 11.20
12	400	+ 30.-	+ 12.30	- 3.50	+ 14.-
13	415	+ 33.-	+ 14.20	- 2.-	+ 15.40
14	439	+ 41.-	+ 17.40	- 0.40	+ 18.20
15	491	+ 54.75	+ 24.-	+ 3.20	+ 26.60
Loss (total)		-103.-	- 74.55	-146.80	- 60.-
Profit (total)		+278.25	+112.-	+ 7.20	+126.-
Profit in 16 years		+175.25	+ 37.45	-139.60	66.-
Profit per year		10.95	2.34	8.72	4.12
% of years of loss		37.5	43.75	87.5	37.5
% of years of covering expenses		0	0	0	0
% of years of profit		62.5	56.25	12.5	65.5

APPENDIX A 5 - PROFIT PROBABILITY IN RELATION TO RAINFALL
IN DRY-LAND FARMING IN 3 REGIONS

Table III.

Erez region

Mm of rainfall	Barley	Wheat (IL)	Hay	Sorghum	
1	130	- 30.-	- 22.80	- 22.20	- 10
2	210	- 22.-	- 12.30	- 16.90	- 10
3	220	- 19.-	- 10.80	- 16.30	- 10
4	240	- 13.50	- 8.40	- 14.80	- 10
5	260	- 8.50	- 6.-	- 13.30	- 10
6	300	+ 2.50	- 0.60	- 10.60	0
7	320	+ 8.50	- 1.80	- 9.10	+ 2.80
8	330	+ 11.-	- 3.-	- 8.40	+ 4.20
9	340	+ 14.-	- 4.50	- 7.70	10.20
10	430	+ 38.-	- 16.20	- 1.10	14.60
11	460	+ 46.25	+ 20.10	+ 1.10	16.-
12	470	+ 49.25	+ 21.30	+ 1.80	17.40
13	480	+ 52.-	+ 22.50	+ 2.50	18.80
14	490	+ 54.75	+ 24.-	+ 3.20	18.80
15	500	+ 57.50	+ 25.20	+ 4.-	20.20
16	520	+ 63.-	+ 27.60	+ 5.40	23.-
17	550	+ 71.25	+ 31.20	+ 7.50	27.20
18	600	+ 95.-	+ 37.20	+ 11.-	36.20
19	610	+ 97.75	+ 38.40	+ 11.70	60
Loss (total)	95.50	64.20	132.30	60	
Profit (total)	660.75	273.-	48.20	228.20	
Profit	565.25	208.80	- 24.10	168.20	
Profit per season	28.26	10.44	- 4.20	8.41	
% of years of loss	30	35	55	30	
% of years of covering expenses	0	0	0	0	
% of years of profit	70	65	45	65	

APPENDIX A 6 - DRY-LAND FARMING YIELDS IN THE SHIKMA REGION IN
1963/64 - 1964/65

Rainfall in mm	Yields in kg		
	Wheat	Barley	Hay
165	340	300	
318	400		
428	240	190	
453	270	280	290
461	300	230	
461	300	230	
504	300	260	
504	280	280	
508	320	260	
510	320	200	
510	290	190	
510	151	200	
520	300	300	
523	300		
526	420	340	
530	260		
550	240	260	
560	190	250	
560	360	260	
Average 479	291	247	

APPENDIX A 7 - DRY-LAND FARMING YIELDS (IN KG/1 DUHAM) ACCORDING TO DISTRIBUTION OF RAINFALL
IN KIBBUTZ RUHAMIA

Rainfall distribution in mm	0 - 150 mm	150 - 250 mm	250 - 350 mm	350 - 425 mm	425 +	Total	Average
Ideal distribution		Wheat 70 Hay 150 Sorghum 0	Wheat 150 Hay 300 Sorghum 120	Wheat 225 Hay 370 Sorghum 200	Wheat 300 Hay 420 Sorghum 270	3 10,2%	
Less than 25% in the beginning		Wheat 40 Hay 130 Sorghum 0	Wheat 120 Hay 280 Sorghum 120	Wheat 180 Hay 350 Sorghum 200	Wheat 250 Hay 400 Sorghum 250	5 17%	
Less than 25% at the end		Wheat 30 Hay 120 Sorghum 0	Wheat 120 Hay 200 Sorghum 100	Wheat 180 Hay 280 Sorghum 180	Wheat 250 Hay 300 Sorghum 220	21 71,4%	
Total for 29 years		Wheat 36 Hay 125 Sorghum 0	Wheat 123 Hay 224 Sorghum 105	Wheat 185 Hay 302 Sorghum 185	Wheat 256 Hay 329 Sorghum 230	29 100%	139 244 128