

Appendix -I Analysis of variance for plant height and primary branches plant⁻¹

SOV	d.f.	MSS									
		Plant height						Branches plant ⁻¹			
		At 30 DAS		At 60 DAS		At Harvest		60DAS		At harvest	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.39	1.14	0.99	44.20	2.06	1.66	0.02	0.04	0.01	0.002
P	2	32.52*	45.76*	74.24*	90.69*	186.80*	91.67*	0.29*	1.61*	1.06*	0.480*
S	2	43.04*	7.37*	134.90*	132.38*	138.08*	129.92*	1.93*	3.05*	1.47*	0.835*
P X S	4	4.70	3.60	30.11	38.02	62.23	60.32	0.11	0.16	0.30	0.299
Error (a)	16	1.59	1.24	10.01	12.77	20.77	20.38	0.04	0.06	0.11	0.100
F	2	0.12	0.19	225.75*	171.81*	92.89*	82.69*	3.88*	5.63*	1.25*	0.919*
P X F	4	1.60	2.10	11.52	10.04	18.02	15.65	0.03	0.07	0.19	0.125
S X F	4	1.50	2.00	2.93	4.75	17.89	16.02	0.04	0.06	0.18	0.129
P X S X F	8	1.30	1.80	5.03	1.69	14.89	13.65	0.02	0.05	0.13	0.108
Error (b)	36	0.62	0.83	4.49	9.05	6.87	6.26	0.01	0.03	0.08	0.057
CV (a) %		9.01	8.16	8.60	9.64	8.27	8.14	5.54	6.60	9.68	9.55
CV (b) %		5.61	6.68	5.76	8.12	4.75	4.51	3.35	4.62	8.18	7.18

* Significant at 5% level of significance

Appendix -II Analysis of variance for DMA plant¹ at 30 and 60 DAS

SOV	d.f.	MSS													
		At 30 DAS						At 60 DAS							
		Leaf		Stem		Total		Leaf		Stem		Reproductive parts		Total	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.003	0.001	0.0006	0.0001	0.006	0.002	0.01	0.02	0.004	0.003	0.001	0.0001	0.005	0.009
P	2	0.021*	0.044*	0.0045*	0.0048*	0.045*	0.078*	0.46*	0.40*	0.774*	1.022*	0.243*	0.243*	4.184*	4.555*
S	2	0.066*	0.047*	0.0184*	0.0241*	0.154*	0.139*	0.82*	0.33*	2.086*	2.327*	0.176*	0.169*	7.663*	6.221*
P X S	4	0.009	0.008	0.0020	0.0018	0.020	0.006	0.21	0.17	0.110	0.034	0.023	0.003	0.669	0.209
Error (a)	16	0.003	0.003	0.0010	0.0006	0.007	0.002	0.07	0.06	0.037	0.012	0.010	0.002	0.290	0.074
F	2	0.001	0.005	0.0001	0.0002	0.001	0.005	1.13*	1.12*	1.643*	1.868*	0.231*	0.227*	7.681*	7.839*
P X F	4	0.005	0.004	0.0013	0.0003	0.009	0.004	0.07	0.09	0.031	0.011	0.007	0.002	0.209	0.109
S X F	4	0.004	0.003	0.0012	0.0003	0.008	0.004	0.06	0.07	0.021	0.013	0.008	0.003	0.203	0.118
P X S X F	8	0.004	0.002	0.0008	0.0002	0.007	0.003	0.06	0.08	0.019	0.009	0.007	0.002	0.211	0.113
Error (b)	36	0.002	0.002	0.0004	0.0002	0.004	0.002	0.03	0.04	0.013	0.005	0.003	0.001	0.098	0.056
CV (a)%		7.22	6.96	7.79	6.17	6.84	3.87	6.67	5.91	9.38	5.40	8.05	3.39	7.36	3.67
CV (b)%		6.01	5.44	4.91	3.03	5.12	3.45	4.23	4.71	5.62	3.56	4.77	3.14	4.28	3.20

* Significant at 5% level of significance

Appendix -III Analysis of variance for DMA plant⁻¹ at 90 DAS

SOV	d.f.	MSS							
		At 90 DAS							
		Leaf		Stem		Reproductive parts		Total	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.01	0.10	0.03	0.02	0.14	0.05	0.30	0.03
P	2	1.96*	1.45*	3.32*	3.06*	14.05*	10.77*	47.59*	38.14*
S	2	2.32*	2.31*	3.92*	3.08*	9.21*	9.12*	41.72*	39.21*
P X S	4	0.09	0.15	0.32	0.25	1.01	0.44	3.35	0.90
Error (a)	16	0.04	0.06	0.12	0.08	0.36	0.15	1.23	0.33
F	2	0.92*	0.75*	2.00*	1.49*	7.34*	6.37*	25.73*	21.01*
P X F	4	0.04	0.06	0.12	0.14	0.35	0.24	1.15	0.51
S X F	4	0.04	0.04	0.14	0.15	0.23	0.21	1.09	0.35
P X S X F	8	0.03	0.05	0.11	0.11	0.29	0.19	1.02	0.42
Error (b)	36	0.02	0.03	0.03	0.06	0.15	0.09	0.47	0.20
CV (a)%		7.82	9.02	6.59	5.43	8.26	5.28	7.31	3.75
CV (b)%		4.93	6.20	4.75	4.64	5.37	4.23	4.53	2.94

*Significant at 5% level of significance

Appendix -IV Analysis of variance for DMA plant⁻¹ at harvest and CGR

SOV	d.f.	MSS											
		DMA at harvest								CGR			
		Leaf		Stem		Reproductive parts		Total		30-60 DAS		60-90 DAS	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.01	0.13	0.02	0.01	0.02	0.07	0.04	0.07	0.001	0.003	0.29	0.03
P	2	2.19*	1.72*	3.18*	2.96*	10.61*	10.08*	42.20*	38.41*	3.521*	3.594*	24.13*	16.67*
S	2	2.93*	2.95*	3.84*	3.07*	9.11*	11.45*	43.03*	46.40*	5.763*	4.594*	14.30*	14.95*
P X S	4	0.15	0.15	0.15	0.22	0.65	0.33	1.95	1.04	0.620	0.221	1.23	0.39
Error (a)	16	0.05	0.05	0.12	0.09	0.29	0.17	1.09	0.36	0.228	0.081	0.43	0.15
F	2	1.06*	0.97*	2.02*	1.51*	7.46*	7.41*	26.78*	24.35*	7.983*	8.356*	5.44*	3.36*
P X F	4	0.04	0.05	0.07	0.13	0.38	0.28	0.94	0.33	0.900	0.182	0.49	0.31
S X F	4	0.03	0.03	0.08	0.18	0.25	0.21	0.92	0.52	0.180	0.155	0.33	0.25
P X S X F	8	0.03	0.04	0.00	0.11	0.24	0.17	0.82	0.40	0.110	0.113	0.23	0.19
Error (b)	36	0.02	0.02	0.06	0.08	0.16	0.14	0.47	0.31	0.075	0.069	0.22	0.13
CV (a)%		8.02	7.81	6.28	5.31	6.99	5.22	6.48	3.66	7.71	4.55	8.27	4.89
CV (b)%		5.02	5.17	4.18	5.14	5.20	4.79	4.25	3.40	4.43	4.20	5.91	4.55

* Significant at 5% level of significance

Appendix -V Analysis of variance for AGR, RGR and BMD

SOV	d.f.	MSS											
		AGR				RGR				BMD			
		30-60 DAS		60-90 DAS		30-60 DAS		60-90 DAS		30-60 DAS		60-90 DAS	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.000001	0.000003	0.0003	0.00003	0.0000005	0.00000003	0.0000001	0.0000001	4.49	4.30	74.15	13.39
P	2	0.0038*	0.0039*	0.0263*	0.01815*	0.0000031*	0.00000137	0.0000143*	0.0000093*	1126.42*	1292.32*	17974.95*	15537.75*
S	2	0.0063*	0.0050*	0.0156*	0.01629*	0.0000026*	0.00000105	0.0000018*	0.0000039*	2246.79*	1849.04*	19068.75*	17146.82*
P X S	4	0.0005	0.0002	0.0013	0.00045	0.0000006	0.00000130	0.0000002	0.0000003	213.25	32.32	1568.32	365.36
Error (a)	16	0.0002	0.0001	0.0005	0.00016	0.0000002	0.00000070	0.0000001	0.0000001	83.33	16.35	588.52	146.96
F	2	0.0087*	0.0091*	0.0059*	0.00366*	0.0000408*	0.00004490*	0.0000009*	0.0000002	1696.17*	1686.68*	13835.41*	12242.52*
P X F	4	0.0002	0.0002	0.0005	0.00031	0.0000004	0.00000150	0.0000001	0.0000004	65.32	23.21	400.35	203.65
S X F	4	0.0002	0.0002	0.0006	0.00024	0.0000003	0.00000081	0.0000001	0.0000005	59.32	18.65	323.32	119.65
P X S X F	8	0.0001	0.0001	0.0004	0.00022	0.0000002	0.00000093	0.0000002	0.0000002	60.32	20.32	236.65	169.69
Error (b)	36	0.0001	0.0001	0.0002	0.00014	0.0000002	0.00000062	0.0000001	0.0000002	29.17	10.77	207.93	87.10
CV (a)%		7.71	4.55	8.27	4.89	1.77	3.16	3.63	3.41	7.15	3.13	7.19	3.57
CV (b)%		4.43	4.20	5.91	4.55	1.70	2.99	3.37	4.22	4.23	2.54	4.27	2.75

* Significant at 5% level of significance

Appendix -VI Analysis of variance for yield attributes

SOV	d.f.	MSS									
		Pods plant ⁻¹		Grains pod ⁻¹		Grains plant ⁻¹		Grain yield plant ⁻¹		100-grain weight	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	3.40	7.58	0.01	0.002	4.13	1.66	0.58	0.07	1.16	0.68
P	2	157.17*	210.45*	0.08*	0.091*	637.61*	829.44*	9.69*	21.07*	3.29*	8.21*
S	2	104.98*	90.77*	0.06*	0.070*	531.11*	500.85*	5.65*	10.82*	2.78*	3.64*
P X S	4	47.86*	11.21	0.02	0.031	35.65	42.13	1.31*	1.58*	2.29	0.80
Error (a)	16	11.56	14.07	0.01	0.012	14.88	17.18	0.33	0.34	0.76	0.85
F	2	168.03*	54.99*	0.12*	0.042*	753.35*	238.24*	13.63*	4.16*	7.26*	7.41*
P X F	4	10.32	9.68	0.01	0.008	22.63	16.65	0.65	0.56	0.72	0.93
S X F	4	12.32	13.65	0.02	0.008	20.35	12.32	0.48	0.74	1.20	0.96
P X S X F	8	9.65	15.65	0.01	0.006	17.65	11.56	0.42	0.39	0.99	1.17
Error (b)	36	5.42	7.23	0.01	0.003	8.61	6.72	0.30	0.32	0.60	0.73
CV (a) %		8.11	8.96	7.81	7.99	7.50	7.96	9.36	9.26	6.20	6.43
CV (b) %		5.55	6.42	6.37	4.19	5.71	4.98	8.88	9.03	5.49	5.97

* Significant at 5% level of significance

Appendix-VII Analysis of variance for yields and harvest index

SOV	d.f.	MSS							
		Grain yield		Haulm yield		Biological yield		Harvest index	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	37680.79	44481.61	134826.76	25515.00	306230.74	122963.53	1.12	9.17
P	2	213992.26*	318385.74*	1238532.15*	729308.89*	2480225.89*	2009827.21*	11.75	6.78
S	2	574158.30*	693695.19*	2634878.09*	1983173.93*	5668629.16*	5022444.21*	7.83	3.76
P X S	4	59678.51*	94743.21*	386916.34*	200094.14*	739688.01*	560977.60*	10.35	5.53
Error (a)	16	17466.42	16884.29	64073.33	61127.23	132711.27	121650.96	4.36	5.45
F	2	312188.11*	369339.16*	1431030.75*	1070004.75*	3070265.02*	2687492.21*	7.48	3.74
P X F	4	20024.13	18883.35	81236.56	72052.10	151219.74	139730.09	8.65	6.22
S X F	4	28293.67	33450.98	91396.65	94444.34	180659.35	228870.71	7.10	3.08
P X S X F	8	19121.27	22959.79	85501.29	72435.84	157963.01	154644.10	6.95	5.94
Error (b)	36	14436.47	16106.35	49515.16	56534.76	103987.17	121145.93	3.71	3.62
CV (a) %		9.29	9.03	9.33	9.19	8.81	8.45	6.04	6.71
CV (b) %		8.45	8.82	8.21	8.84	7.80	8.43	5.57	5.47

* Significant at 5% level of significance

Appendix -VIII Analysis of variance for protein, methionine, cysteine and cystine content in grain and chlorophyll content in leaves at 60 DAS

SOV	d.f.	MSS									
		Protein		Methionine		Cysteine		Cystine		Chlorophyll content	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.50	0.47	0.004	0.006	0.004	0.002	0.001	0.001	0.001	0.007
P	2	7.96*	5.72*	0.007	0.002	0.004	0.002	0.010	0.015	2.423*	2.467*
S	2	11.25*	7.50*	0.176*	0.127*	0.256*	0.110*	0.096*	0.059*	1.769*	6.662*
P X S	4	2.06	2.28	0.024	0.012	0.029	0.016	0.021	0.019	0.003	0.015
Error (a)	16	1.00	0.97	0.010	0.006	0.011	0.007	0.008	0.008	0.002	0.007
F	2	11.83*	5.23*	0.064*	0.187*	0.034*	0.140*	0.046*	0.051*	4.029*	2.985*
P X F	4	1.41	1.69	0.011	0.005	0.012	0.004	0.007	0.007	0.002	0.013
S X F	4	1.58	1.32	0.009	0.004	0.011	0.006	0.006	0.006	0.001	0.012
P X S X F	8	1.05	1.09	0.007	0.005	0.008	0.003	0.004	0.004	0.001	0.011
Error (b)	36	0.68	0.68	0.004	0.002	0.005	0.003	0.003	0.003	0.001	0.006
CV (a) %		4.60	4.54	9.52	7.25	9.42	7.54	8.86	8.69	2.19	3.79
CV (b) %		3.80	3.79	6.27	4.42	6.08	4.65	5.13	5.29	1.17	3.51

* Significant at 5% level of significance

Appendix-IX: Analysis of variance for N content and uptake

SOV	d.f.	MSS											
		N content						N uptake					
		Leaves at 60 DAS		Grain		Haulm		Grain		Haulm		Total N uptake	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.0102	0.0131	0.01	0.01	0.0043	0.0004	40.45	73.94	13.99	2.57	89.21	93.56
P	2	1.7720*	0.6540*	0.20*	0.15*	0.0912*	0.0376*	444.17*	531.91*	222.38*	125.99*	1293.34*	1175.33*
S	2	1.2307*	0.3882*	0.29*	0.19*	0.0186*	0.0361*	1060.53*	1122.37*	214.64*	233.24*	2228.44*	2378.61*
P X S	4	0.0133	0.0158	0.03	0.02	0.0028	0.0012	243.50*	275.04*	54.50*	26.03*	492.03*	440.82*
Error (a)	16	0.0050	0.0055	0.03	0.02	0.0015	0.0009	25.46	22.10	4.03	3.82	44.84	29.86
F	2	1.4299*	1.3898*	0.30*	0.13*	0.0548*	0.0589*	722.70*	663.95*	204.29*	199.03*	1684.21*	1589.33*
P X F	4	0.0007	0.0030	0.04	0.02	0.0021	0.0005	21.25	19.01	7.94	6.17	45.86	24.83
S X F	4	0.0006	0.0019	0.02	0.03	0.0019	0.0009	20.12	48.35	8.86	7.08	83.13	42.99
P X S X F	8	0.0005	0.0017	0.02	0.01	0.0012	0.0007	25.52	52.30	5.78	7.62	31.86	71.45
Error (b)	36	0.0003	0.0012	0.02	0.02	0.0014	0.0004	20.60	28.48	3.71	4.14	34.34	49.37
CV (a) %		2.15	2.19	4.60	4.54	4.91	3.95	10.15	9.34	9.28	9.26	9.39	7.65
CV (b) %		0.50	1.02	3.80	3.79	4.71	2.57	9.13	10.61	8.91	9.63	8.22	9.84

* Significant at 5% level of significance

Appendix-X Analysis of variance for P content and uptake

SOV	d.f.	MSS											
		P content						P uptake					
		Leaves at 60 DAS		Grain		Haulm		Grain		Haulm		Total P uptake	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.000004	0.00035	0.00002	0.00029	0.00005	0.00004	0.53	0.58	0.85	0.38	2.89	2.07
P	2	0.002210*	0.00559*	0.00416*	0.00373*	0.00133*	0.00248*	6.33*	6.01*	13.39*	10.89*	38.14*	33.08*
S	2	0.001461*	0.00792*	0.00726*	0.00120*	0.00084*	0.00166*	13.54*	10.35*	16.68*	16.92*	59.72*	53.74*
P X S	4	0.000365	0.00037	0.00042	0.00029	0.00015	0.00016	1.24*	15.11*	4.35*	4.61*	1.73	20.92*
Error (a)	16	0.000125	0.00014	0.00019	0.00010	0.00009	0.00006	0.36	0.18	0.26	0.32	0.89	0.79
F	2	0.002881*	0.00269*	0.00889*	0.00380*	0.00271*	0.00292*	9.55*	9.60*	13.80*	13.37*	46.26*	45.53*
P X F	4	0.000265	0.00021	0.00026	0.00014	0.00009	0.00006	0.34	0.30	0.68	0.87	1.19	1.78
S X F	4	0.000137	0.00011	0.00018	0.00011	0.00010	0.00007	0.45	0.38	0.70	0.69	1.22	1.71
P X S X F	8	0.000205	0.00022	0.00015	0.00010	0.00008	0.00005	0.41	0.36	0.65	0.29	1.39	2.03
Error (b)	36	0.000102	0.00011	0.00011	0.00006	0.00004	0.00003	0.21	0.20	0.31	0.36	0.83	0.97
CV (a) %		2.48	2.62	3.91	2.91	4.31	3.45	11.82	8.75	8.45	9.33	8.51	8.14
CV (b) %		2.25	2.38	3.03	2.22	2.89	2.38	8.97	9.05	9.28	9.95	8.22	9.00

* Significant at 5% level of significance

Appendix-XI Analysis of variance for K content and uptake

SOV	d.f.	MSS											
		K content						K uptake					
		Leaves at 60 DAS		Grain		Haulm		Grain		Haulm		Total K uptake	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.0020	0.0084	0.00002	0.00022	0.0028	0.0007	1.77	2.10	68.77	12.16	90.86	21.22
P	2	0.2390*	0.1883*	0.02326*	0.03822*	0.0393*	0.1932*	24.51*	41.34*	669.63*	691.97*	937.11*	1071.31*
S	2	0.4935*	0.4267*	0.09053*	0.08077*	0.4810*	0.8171*	78.85*	83.66*	2241.47*	2264.51*	3161.08*	3218.59*
P X S	4	0.0046	0.0295	0.00087	0.00213	0.0069	0.0067	3.44*	4.48*	48.21	181.97*	55.90	241.68*
Error (a)	16	0.0047	0.0130	0.00047	0.00156	0.0028	0.0073	0.86	0.59	27.55	22.56	35.44	28.75
F	2	0.2577*	0.2485*	0.06216*	0.04707*	0.3695*	0.3485*	48.61*	48.36*	1355.79*	1125.27*	1917.77*	1638.25*
P X F	4	0.0029	0.0108	0.00041	0.00081	0.0041	0.0032	1.59	2.01	37.77	35.09	52.02	61.65
S X F	4	0.0014	0.0189	0.00019	0.00031	0.0016	0.0017	1.17	2.03	39.68	54.12	46.18	72.65
P X S X F	8	0.0042	0.0201	0.00046	0.00015	0.0033	0.0020	1.36	1.65	26.36	40.84	34.41	45.65
Error (b)	36	0.0020	0.0110	0.00024	0.00105	0.0016	0.0041	0.62	0.79	17.12	23.09	22.41	29.99
CV (a) %		2.84	4.74	3.25	5.97	2.75	4.46	9.68	8.00	9.96	9.12	9.56	8.69
CV (b) %		1.86	4.36	2.33	4.90	2.08	3.36	8.23	9.23	7.85	9.23	7.60	8.87

* Significant at 5% level of significance

Appendix-XII Analysis of variance for S content and uptake

SOV	d.f.	MSS											
		S content						S uptake					
		Leaves at 60 DAS		Grain		Haulm		Grain		Haulm		Total S uptake	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	0.00005	0.000003	0.00004	0.00004	0.000009	0.000002	0.19	0.20	0.10	0.02	0.54	0.30
P	2	0.00177*	0.001068*	0.00411*	0.00190*	0.000270*	0.000134*	3.15*	3.02*	1.62*	0.89*	9.30*	7.18*
S	2	0.00384*	0.001998*	0.00881*	0.00312*	0.000451*	0.000514*	7.20*	5.55*	2.93*	2.54*	19.32*	15.56*
P X S	4	0.00019	0.000072	0.00017	0.00009	0.000013	0.000013	0.14	0.17*	0.10*	0.11*	0.28	0.39
Error (a)	16	0.00008	0.000043	0.00007	0.00006	0.000012	0.000011	0.09	0.06	0.03	0.03	0.21	0.15
F	2	0.00193*	0.001512*	0.00228*	0.00222*	0.000346*	0.000178*	2.94*	3.24*	1.78*	1.20*	9.30*	8.38*
P X F	4	0.00010	0.000029	0.00006	0.00003	0.000005	0.000008	0.13	0.10	0.06	0.06	0.22	0.41
S X F	4	0.00009	0.000018	0.00005	0.00004	0.000005	0.000003	0.09	0.07	0.05	0.04	0.29	0.39
P X S X F	8	0.00008	0.000006	0.00004	0.00004	0.000007	0.000009	0.03	0.08	0.05	0.05	0.27	0.33
Error (b)	36	0.00004	0.000018	0.00003	0.00002	0.000003	0.000004	0.05	0.06	0.03	0.03	0.13	0.16
CV (a) %		4.22	3.20	4.29	4.06	4.65	4.55	11.11	8.34	8.65	9.33	9.62	7.91
CV (b) %		3.11	2.05	2.69	2.44	2.56	2.86	8.31	8.36	7.98	9.27	7.69	8.25

* Significant at 5% level of significance

Appendix-XIII Analysis of variance for available N, P, K and S content in soil at harvest and net returns and benefit cost ratio

SOV	d.f.	MSS											
		Available N		Available P		Available K		Available S		Net returns		B C ratio	
		2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
Rep	2	367.21	42.66	0.46	0.34	1678.61	721.94	0.66	2.01	46962990	51945915	0.10	0.12
P	2	2562.59*	3171.64*	100.71*	102.24*	49.15	1270.21	8.00	2.59	145374510*	241683353*	0.10	0.21*
S	2	161.10	94.04	3.87	1.12	76.97	21.68	201.27*	167.45*	704950246*	872425624*	1.48*	1.74*
P X S	4	593.32	698.65	2.98	5.76	664.65	757.12	12.20	15.24	81085569*	121757950*	0.19*	0.28*
Error (a)	16	533.07	407.18	2.00	2.07	880.72	712.84	4.78	5.74	21134257	21427629	0.04	0.04
F	2	154.81	297.86	0.01	0.12	81.07	62.37	1.54	1.35	142029856*	187453741*	0.03	0.02
P X F	4	409.65	211.72	1.95	1.44	1097.21	449.12	3.12	3.68	21516601	22809152	0.04	0.05
S X F	4	569.00	298.98	1.10	1.30	864.45	1119.89	3.26	2.28	36702374	44032982	0.03	0.04
P X S X F	8	498.65	130.98	0.57	1.35	490.61	493.01	2.64	2.35	22160508	27669013	0.04	0.05
Error (b)	36	227.26	182.43	0.83	0.83	578.99	460.13	2.41	3.27	17322516	20876069	0.04	0.04
CV (a) %		8.88	7.75	8.82	8.84	8.56	7.61	7.93	8.93	16.05	15.38	16.12	15.94
CV (b) %		5.80	5.19	5.68	5.59	6.94	6.12	5.63	6.74	14.53	15.18	14.65	15.48

* Significant at 5% level of significance

Appendix-XIV Pooled analysis of variance for plant height, primary branches plant⁻¹ and DMA at 30 DAS and 60 DAS

SOV	d.f.	MSS											
		Plant height			Primary branches		DMA at 30 DAS			DMA at 60 DAS			
		30 DAS	60 DAS	At harvest	60 DAS	At harvest	Leaves	Stem	Total	Leaves	Stem	Reproductive parts	Total
YEAR	1	5.74	2.91	4.738638	0.05	0.06	0.002	0.00005	0.0012	0.20	0.001	0.0020	0.28
REP(Y)	4	0.76	22.60	1.862119	0.03	0.01	0.002	0.00040	0.0038	0.01	0.004	0.0005	0.01
P	2	77.69*	163.35*	265.7641*	1.62*	1.48*	0.063*	0.00929*	0.1208*	0.86*	1.781*	0.4786*	8.71*
S	2	42.84*	265.84*	267.933*	4.89*	2.26*	0.113*	0.04228*	0.2926*	1.09*	4.408*	0.3450*	13.85*
YP	2	0.59	1.58	12.701451	0.12	0.06	0.002	0.00002	0.0023	0.00	0.015	0.0069	0.03
YS	2	4.58	1.43	0.062564	0.10	0.05	0.001	0.00019	0.0002	0.06	0.005	0.0003	0.04
PS	4	2.85	15.69	178.05304	0.12	0.14	0.005	0.00131	0.0068	0.10	0.034	0.0095	0.39
YPS	4	1.85	2.42	0.00001	0.04	0.17	0.001	0.00017	0.0016	0.01	0.012	0.0005	0.04
Error(a)	32	1.42	11.39	20.572274	0.05	0.10	0.003	0.00082	0.0044	0.07	0.025	0.0056	0.18
F	2	0.11	395.71*	175.4262*	9.21*	2.15*	0.005	0.00037	0.0047	2.23*	3.507*	0.4577*	15.50*
PF	4	1.17	8.40	14.664685	0.03	0.15	0.004	0.00019	0.0034	0.07	0.019	0.0056	0.15
SF	4	1.11	5.58	13.25662	0.05	0.12	0.003	0.00014	0.0038	0.08	0.018	0.0037	0.13
PSF	8	1.36	4.57	7.4456485	0.04	0.13	0.003	0.00026	0.0027	0.04	0.018	0.0036	0.13
YF	2	0.21	1.84	0.148542	0.06	0.01	0.001	0.00001	0.0008	0.02	0.004	0.0001	0.02
YPF	4	0.92	2.03	0.000015	0.05	0.12	0.001	0.00052	0.0016	0.03	0.003	0.0007	0.02
YSF	4	1.16	2.11	0.00001	0.03	0.14	0.001	0.00029	0.0014	0.05	0.004	0.0003	0.04
YPSF	8	1.37	2.14	0.00001	0.04	0.09	0.001	0.00010	0.0008	0.06	0.002	0.0002	0.07
Error B	72	0.72	6.77	6.562930	0.02	0.07	0.002	0.00028	0.0027	0.03	0.01	0.0024	0.08
CV (a) %		8.61	9.14	8.20	6.10	9.61	7.09	7.03	5.55	6.29	7.65	6.16	5.79
CV (b) %		6.16	7.05	4.63	4.04	7.70	5.73	4.08	4.36	4.48	4.70	4.03	3.77

* Significant at 5% level of significance

Appendix-XV Pooled analysis of variance for DMA at 90 DAS and harvest

SOV	d.f.	M.S.S.							
		At 90 DAS				At harvest			
		Leaves	Stem	Reproductive parts	Total	Leaves	Stem	Reproductive parts	Total
YEAR	1	0.06	0.05	0.21	0.22	0.137	0.116	0.84	0.89
REP(Y)	4	0.06	0.03	0.09	0.17	0.072	0.018	0.05	0.06
P	2	3.40*	6.38*	24.71*	85.46*	3.895*	6.134*	20.66*	80.54*
S	2	4.62*	6.98*	18.32*	80.91*	5.873*	6.873*	20.24*	89.28*
YP	2	0.02	0.00	0.11	0.27	0.016	0.004	0.03	0.06
YS	2	0.01	0.03	0.02	0.02	0.003	0.028	0.32	0.15
PS	4	0.09	0.18	0.54	2.01	0.060	0.115	0.29	1.84
YPS	4	0.02	0.05	0.09	0.22	0.014	0.079	0.10	0.16
Error(a)	32	0.05	0.10	0.25	0.78	0.052	0.106	0.23	0.72
F	2	1.66*	3.47*	13.69*	46.62*	2.019*	3.509*	14.87*	51.09*
PF	4	0.04	0.15	0.19	0.75	0.025	0.098	0.32	0.78
SF	4	0.03	0.06	0.13	0.80	0.019	0.098	0.34	0.64
PSF	8	0.02	0.04	0.16	0.29	0.030	0.033	0.07	0.49
YF	2	0.01	0.02	0.02	0.12	0.002	0.024	0.00	0.04
YPF	4	0.01	0.01	0.08	0.11	0.015	0.056	0.24	0.49
YSF	4	0.02	0.03	0.14	0.27	0.024	0.090	0.04	0.86
YPSF	8	0.02	0.03	0.06	0.15	0.027	0.039	0.08	0.20
Error B	72	0.02	0.06	0.12	0.34	0.022	0.069	0.15	0.39
CV (a) %		8.45	6.04	6.92	5.80	7.91	5.82	6.15	5.25
CV (b) %		5.61	4.70	4.82	3.81	5.10	4.68	4.99	3.84

* Significant at 5% level of significance

Appendix-XVI Pooled analysis of variance for CGR, AGR, RGR and BMD

SOV	d.f.	MSS							
		CGR		AGR		RGR		BMD	
		30-60	60-90	30-60	60-90	30-60	60-90	30-60	60-90
YEAR	1	0.247	0.003	0.000269	0.000003	0.0000006	0.0000004	70.75	224.14
REP(Y)	4	0.002	0.158	0.000002	0.000172	0.0000003	0.0000001	4.40	43.77
P	2	7.099*	40.451*	0.007730*	0.044051*	0.0000042*	0.0000233*	2409.75*	33458.51*
S	2	10.323*	29.252*	0.011242*	0.031856*	0.0000035*	0.0000056*	4085.99*	36189.91*
YP	2	0.016	0.349	0.000018	0.000380	0.0000002	0.0000003	9.00	54.20
YS	2	0.034	0.004	0.000037	0.000005	0.0000002	0.0000002	9.83	25.66
PS	4	0.209	0.595	0.000098	0.000265	0.0000010	0.0000002	108.65	789.95
YPS	4	0.051	0.344	0.000055	0.000374	0.0000008	0.0000003	6.04	40.48
Error(a)	32	0.154	0.290	0.000168	0.000316	0.0000005	0.0000001	49.84	367.74
F	2	16.324*	8.669*	0.017777*	0.009441*	0.0000856*	0.0000010*	3379.05*	26044.25*
PF	4	0.105	0.325	0.000170	0.000351	0.0000009	0.0000002	48.95	176.98
SF	4	0.104	0.165	0.000050	0.000186	0.0000006	0.0000003	28.95	179.96
PSF	8	0.031	0.205	0.000150	0.000054	0.0000004	0.0000002	31.39	189.98
YF	2	0.016	0.133	0.000017	0.000144	0.0000001	0.0000002	3.80	33.69
YPF	4	0.020	0.057	0.000022	0.000062	0.0000002	0.0000001	5.42	43.89
YSF	4	0.035	0.321	0.000038	0.000350	0.0000003	0.0000003	8.89	67.49
YPSF	8	0.063	0.245	0.000068	0.000267	0.0000004	0.0000002	16.09	41.99
Error B	72	0.072	0.175	0.000079	0.000190	0.0000004	0.0000002	19.97	147.52
CV (a) %		6.31	6.80	6.31	6.80	2.57	3.52	5.50	5.66
CV (b) %		4.32	5.28	4.32	5.28	2.44	3.82	3.48	3.59

* Significant at 5% level of significance

Appendix-XVII Pooled analysis of variance for yield attributes, yields and harvest index

SOV	d.f.	MSS								
		Pods plant ⁻¹	Grains pod ⁻¹	Grains plant ⁻¹	Grain yield plant ⁻¹	100 Grain weight	Grain yield	Haulm yield	Biological yield	Harvest index
YEAR	1	0.24	0.00001	17.93	1.27	2.10	10718.27	20031.18	1444.19	1.91
REP(Y)	4	5.49	0.00674	2.89	0.33	0.92	41081.20	80170.88	214597.13	5.15
P	2	365.62*	0.17227*	1457.66*	29.66*	10.74*	526845.79*	1932239.49*	4476985.34*	0.34
S	2	195.50*	0.13181*	1031.30*	16.02*	6.16*	1264981.81*	4594524.32*	10681113.14*	0.38
YP	2	2.00	0.00175	9.40	0.95	0.76	5532.21	35601.54	13067.77	8.19
YS	2	0.26	0.00031	0.66	0.46	0.26	2871.68	23527.70	9960.22	11.21
PS	4	47.17*	0.00958	26.54	0.99*	0.84	150298.23*	560102.31*	1290620.26*	0.40
YPS	4	11.90	0.01389	22.92	0.61	1.05	4123.50	26908.17	10045.35	5.48
Error(a)	32	12.81	0.01198	16.03	0.33	0.80	17175.36	62600.28	127181.11	4.91
F	2	207.60*	0.14950*	916.33*	16.43*	13.52*	677987.60*	2478434.87*	5748981.57*	0.42
PF	4	10.55	0.00986	18.67	0.64	1.36	33028.49	120800.27	279966.24	0.44
SF	4	10.85	0.00994	13.86	0.62	0.85	29659.65	123986.36	212369.36	0.48
PSF	8	5.56	0.00500	7.15	0.32	0.58	26985.32	102359.35	102359.96	0.41
YF	2	15.43	0.01004	5.26	0.37	1.16	3539.67	22600.63	8775.67	10.81
YPF	4	1.03	0.00862	6.13	0.17	0.29	5878.99	32488.39	10983.59	7.04
YSF	4	5.80	0.00454	8.66	0.61	0.31	2729.96	17795.67	6929.16	1.70
YPSF	8	3.68	0.00837	2.20	0.39	0.95	5226.39	29700.94	10214.43	1.32
Error B	72	6.32	0.00558	7.67	0.31	0.66	15271.41	53024.96	112566.55	3.67
CV (a) %		8.54	7.90	7.74	9.31	6.32	9.16	9.26	8.63	6.39
CV (b) %		6.00	5.39	5.35	8.96	5.74	8.64	8.53	8.12	5.52

* Significant at 5% level of significance

Appendix-XVIII Pooled analysis of variance for protein, methionine, cysteine and cystine content in grain and chlorophyll content in leaves at 60 DAS

SOV	d.f.	MSS				
		Protein content	Methionine content	Cysteine content	Cystine content	chlorophyll content
YEAR	1	0.0001	0.0111	0.0356	0.00026	0.0193
REP(Y)	4	0.4827	0.0048	0.0029	0.00124	0.0042
P	2	13.5681*	0.0076	0.0030	0.02408	4.8743*
S	2	18.3005*	0.2991*	0.3500*	0.15044*	7.6413*
YP	2	0.1051	0.0009	0.0032	0.00052	0.0154
YS	2	0.4492	0.0038	0.0157	0.00475	0.0079
PS	4	1.2968	0.0096	0.0186	0.01898	0.0095
YPS	4	1.8604	0.0105	0.0094	0.01370	0.0085
Error(a)	32	0.9846	0.0082	0.0091	0.00830	0.0049
F	2	15.9221*	0.2331*	0.1513*	0.09654*	6.7363*
PF	4	0.8037	0.0027	0.0059	0.00715	0.0040
SF	4	0.9155	0.0076	0.0025	0.00698	0.0067
PSF	8	0.8495	0.0048	0.0071	0.00599	0.0030
YF	2	0.9865	0.0037	0.0069	0.00073	0.0060
YPF	4	0.9957	0.0041	0.0060	0.00198	0.0076
YSF	4	0.7899	0.0025	0.0055	0.00144	0.0077
YPSF	8	0.8559	0.0037	0.0044	0.00126	0.0065
Error B	72	0.6799	0.0034	0.0037	0.00292	0.0035
CV (a) %		4.57	8.45	8.56	8.78	3.10
CV (b) %		3.80	5.41	5.43	5.21	2.63

* Significant at 5% level of significance

Appendix-XIX Pooled analysis of variance for N and P content in leaves at 60 DAS, grain and haulm and uptake in grain, haulm total uptake

SOV	d.f.	MSS											
		N content			N uptake			P content			P uptake		
		Leaves at 60 DAS	Grain	Haulm	Grain	Haulm	Total	Leaves at 60 DAS	Grain	Haulm	Grain	Haulm	Total
YEAR	1	0.018	0.00001	0.0024	15.06	10.08	0.50	0.00003	0.0002	0.00023	0.939	0.001	0.87
REP(Y)	4	0.010	0.01236	0.0023	57.20	9.78	91.38	0.00018	0.0002	0.00005	0.606	0.666	2.03
P	2	2.290*	0.34734*	0.1230*	974.09*	341.49*	2467.18*	0.00733*	0.0079*	0.00371*	12.345*	24.210*	71.13*
S	2	1.499*	0.46849*	0.0532*	2182.09*	447.68*	4605.37*	0.00808*	0.0068*	0.00244*	23.574*	33.600*	113.20*
YP	2	0.014	0.00269	0.0019	1.99	6.89	1.49	0.00008	0.0000	0.00011	0.002	0.065	0.09
YS	2	0.012	0.01150	0.0015	0.81	0.20	1.67	0.00013	0.0003	0.00007	0.313	0.003	0.26
PS	4	0.011	0.05490	0.0030	496.55*	72.06*	918.79*	0.00022	0.0002	0.00019	6.458*	7.852*	16.07*
YPS	4	0.011	0.01460	0.0019	21.98	8.47	14.06	0.00019	0.0003	0.00018	0.589	0.698	1.58
Error(a)	32	0.005	0.02521	0.0012	23.78	3.93	37.35	0.00013	0.0001	0.00007	0.271	0.287	0.84
F	2	2.691*	0.40761*	0.1136*	1376.71*	403.05*	3266.36*	0.00555*	0.0122*	0.00562*	19.073*	27.162*	91.75*
PF	4	0.001	0.04127	0.0011	12.63	6.93	55.03	0.00017	0.0002	0.00026	0.362	0.789	1.54
SF	4	0.001	0.02360	0.0014	59.69	8.65	104.04	0.00019	0.0002	0.00008	0.324	0.710	1.52
PSF	8	0.001	0.03598	0.0017	14.88	7.98	79.23	0.00012	0.0001	0.00007	0.271	0.609	1.37
YF	2	0.001	0.02902	0.0001	9.94	0.28	7.18	0.00002	0.0002	0.00002	0.072	0.008	0.04
YPF	4	0.001	0.00986	0.0013	27.64	4.18	15.66	0.00018	0.0002	0.00003	0.275	0.681	1.43
YSF	4	0.001	0.01255	0.0012	24.12	7.24	42.78	0.00016	0.0001	0.00004	0.352	0.579	1.78
YPSF	8	0.001	0.01236	0.0011	12.94	3.53	14.08	0.00015	0.0001	0.00005	0.195	0.494	1.34
Error B	72	0.001	0.017407	0.0009	24.54	3.92	41.85	0.00011	0.0001	0.00003	0.201	0.335	0.90
CV (a) %		2.17	4.57	4.46	9.75	9.27	8.56	2.55	3.48	3.90	10.45	8.90	8.33
CV (b) %		0.81	3.80	3.81	9.91	9.27	9.06	2.32	2.68	2.64	9.01	9.62	8.61

* Significant at 5% level of significance

Appendix-XX Pooled analysis of variance for K and S content in leaves at 60 DAS, grain and haulm and uptake in grain, haulm total uptake

SOV	d.f.	MSS											
		K content			K uptake			S content			S uptake		
		Leaves at 60 DAS	Grain	Haulm	Grain	Haulm	Total	Leaves at 60 DAS	Grain	Haulm	Grain	Haulm	Total
YEAR	1	0.00004	0.0009	0.0081	0.10	15.14	12.75	0.00001	0.00007	0.000005	0.26	0.02	0.20
REP(Y)	4	0.00525	0.0001	0.0018	0.19	40.47	56.04	0.00003	0.00004	0.000006	0.19	0.06	0.42
P	2	0.42585*	0.0557*	0.2028*	63.43*	1361.49*	2004.92*	0.00279*	0.00580*	0.000392*	6.17*	2.45*	16.41*
S	2	0.91850*	0.1709*	1.2744*	162.46*	4505.31*	6378.67*	0.00568*	0.01116*	0.000958*	12.70*	5.44*	34.75*
YP	2	0.00152	0.0016	0.0123	2.02	0.11	3.49	0.00005	0.00021	0.000012	0.00	0.06	0.07
YS	2	0.00165	0.0004	0.0106	0.05	0.67	1.00	0.00017	0.00010	0.000007	0.06	0.02	0.13
PS	4	0.01370	0.0021	0.0103	6.16*	176.53*	232.84*	0.00007	0.00008	0.000014	0.24*	0.06*	0.64*
YPS	4	0.01986	0.0019	0.0120	1.75	53.65	64.73	0.00005	0.00014	0.000026	0.07	0.04	0.03
Error(a)	32	0.00885	0.0010	0.0050	0.73	25.05	32.10	0.00006	0.00007	0.000011	0.08	0.03	0.18
F	2	0.50619*	0.1087*	0.7174*	96.91*	2473.48*	3548.96*	0.00342*	0.00449*	0.000509*	6.17*	2.95*	17.66*
PF	4	0.00879	0.0011	0.0065	1.72	47.63	59.65	0.00001	0.00006	0.000009	0.11	0.03	0.29
SF	4	0.00235	0.0009	0.0049	1.63	41.22	41.98	0.00006	0.00004	0.000007	0.08	0.04	0.18
PSF	8	0.00999	0.0010	0.0049	1.34	35.84	28.83	0.00005	0.00003	0.000008	0.06	0.02	0.19
YF	2	0.00004	0.0005	0.0005	0.05	7.58	7.06	0.00002	0.00005	0.000006	0.01	0.03	0.01
YPF	4	0.00436	0.0012	0.0013	0.55	15.08	17.62	0.00003	0.00006	0.000005	0.07	0.03	0.02
YSF	4	0.00956	0.0007	0.0033	1.15	14.80	21.89	0.00006	0.00003	0.000004	0.11	0.02	0.01
YPSF	8	0.00156	0.0006	0.0021	0.97	21.00	24.76	0.00006	0.00002	0.000008	0.07	0.06	0.02
Error B	72	0.00651	0.0006	0.0029	0.71	20.11	26.20	0.00003	0.00002	0.000004	0.05	0.03	0.15
CV (a) %		3.91	4.80	3.70	8.88	9.55	9.14	3.74	4.17	4.60	9.78	9.00	8.80
CV (b) %		3.35	3.83	2.79	8.75	8.56	8.26	2.64	2.57	2.71	8.34	8.65	7.98

* Significant at 5% level of significance

Appendix –XXI Pooled analysis of variance for available N, P, K and S content in soil at harvest and net return and benefit cost ratio

SOV	d.f.	MSS					
		Available N	Available P	Available K	Available S	Net returns	B C ratio
YEAR	1	1.88	2.65	689.29	20.72	85754479	0.02
REP(Y)	4	204.93	0.40	1200.27	1.34	49454453	0.11
P	2	5717.59*	202.94*	850.05	9.44	380911232*	0.30*
S	2	240.81	4.57	65.87	367.68*	1572898519*	3.21*
YP	2	16.64	0.00	469.31	1.16	6146631	0.01
YS	2	14.34	0.41	32.78	1.05	4477351	0.01
PS	4	594.68	4.39	1599.98	6.37	199060586*	0.46*
YPS	4	659.65	0.97	1803.65	0.68	3782934	0.01
Error(a)	32	470.12	2.03	796.78	5.26	21280943	0.04
F	2	365.70	0.03	142.09	2.88	325601562*	0.04
PF	4	375.98	1.24	1092.14	6.73	39698311	0.08
SF	4	293.98	1.61	1298.33	2.50	28405779	0.08
PSF	8	254.65	1.50	486.75	4.63	15833663	0.08
YF	2	86.98	0.09	1.35	0.01	3882036	0.01
YPF	4	278.98	0.18	454.19	2.07	4627442	0.01
YSF	4	182.86	0.48	686.01	3.21	2202311	0.01
YPSF	8	198.56	1.54	496.88	1.42	4187774	0.01
Error B	72	204.84	0.83	519.56	2.84	19099292	0.04
CV (a) %		8.33	8.83	8.10	8.43	15.71	16.03
CV (b) %		5.50	5.64	6.54	6.20	14.88	15.08

* Significant at 5% level of significance

Appendix-XXII: Cost of cultivation and prices used to compute economics

Particulars	Cost (₹)/ unit		Total cost (₹/ha)	
	2012-13	2013-14	2012-13	2013-14
A. Common cost of cultivation				
1. Field preparation (6hrs)	400	400	2400	2400
2. Layout and seedbed preparation (8 man days)	135 man ⁻¹ day ⁻¹	135 man ⁻¹ day ⁻¹	1080	1080
3. Seed (80 kg)	40` kg <sup>-1</sup>	40` kg ⁻¹	3200	3200
4. Sowing and fertilizer application (15 man days)	147 man ⁻¹ day ⁻¹	159 man ⁻¹ day ⁻¹	2205	2385
5. Seed treatment	--	--	600	600
7. Irrigation (2)	400 irrigation ⁻¹	400 irrigation ⁻¹	800	800
8. Thinning, gap filling, hoeing and weeding (20 man days)	147 man ⁻¹ day ⁻¹	159 man ⁻¹ day ⁻¹	2940	3180
9. Harvesting (15 man days)	147 man ⁻¹ day ⁻¹	159 man ⁻¹ day ⁻¹	2205	2385
10. Threshing and Winnowing (10 man days)	147 man ⁻¹ day ⁻¹	159 man ⁻¹ day ⁻¹	1470	1590
Total			16900	17620
B. Cost of treatments				
Phosphorus (Through DAP)				
20 kg P ₂ O ₅ ha ⁻¹			1120	1120
40kg P ₂ O ₅ ha ⁻¹			2149	2149
60 kg P ₂ O ₅ ha ⁻¹			3089	3089
Sulphur (Through Mineral Gypsum)				
00 kg S ha ⁻¹			--	--
20 kg S ha ⁻¹			167	167
40 kg S ha ⁻¹			333	333
Seaweed Sap				
water spray (3 spray) + labour cost			882	954
<i>Kappaphycus</i> 10 % (3 spray) + labour cost			3582	3654
<i>Gracilaria</i> 10 % (3 spray) + labour cost			3582	3654
Cost of fertilizers				
Urea ₹ 285 per 50 kg bag				
DAP ₹ 1186 per 50 kg bag				
<i>Kappaphycus</i> ₹ 15 per litre				
<i>Gracilaria</i> ₹ 15 per litre				
Selling price:				
Chickpea grain in 2012-13 : 32 ₹ kg ⁻¹				
Chickpea grain in 2013-14 : 33 ₹ kg ⁻¹				
Chickpea straw in 2012-13 : 1.85 ₹ kg ⁻¹				
Chickpea straw in 2013-14 : 1.95 ₹ kg ⁻¹				