

Table S1. Simulated differences in crop production (grain/stover yield gain/loss [kg ha⁻¹]) after virtual introgression of variability in various parameters/combination of parameters from Table 2 within particular stress scenarios and production zones; i.e. the positive number signify the yield benefits compared to original M35-1 genotype and *vice versa*. As the measure of variability, the first and third quartile is shown along with the means. Alongside, there are calculated rough estimates of monetary benefits/losses from particular trait/trait combinations within the production zones (considering fixed price 15 Rs kg⁻¹ grain and 5 Rs kg⁻¹ stover)

APSIM coefficient	% of parameter change & physiological meaning	stress scenario	grain (kg ha ⁻¹)	stover (kg ha ⁻¹)	zone	grain (kg ha ⁻¹)	stover (kg ha ⁻¹)	value estimate (Rs ha ⁻¹)	APSIM coefficient	% of parameter change & physiological meaning	stress scenario	grain (kg ha ⁻¹)	stover (kg ha ⁻¹)	zone	grain (kg ha ⁻¹)	stover (kg ha ⁻¹)	value estimate (Rs ha ⁻¹)	
mainStemCoef	0.05	pre-flowering	-86 (-70;0)	160 (39;254)	Central	-71 (-142;28)	259 (130;387)	230	mainStemCoefLowTR	0.05	pre-flowering	-154 (-286;0)	219 (39;370)	Central	-43 (-102;28)	208 (102;296)	395	
		larger canopy	flowering	-190 (-366;0)	328 (120;490)	FarSouth	-25 (-203;180)	418 (266;576)			1715	flowering	-191 (-258;-96)	293 (206;390)	FarSouth	-11 (-192;197)	301 (155;448)	1340
			post-flowering	-127 (-278;0)	410 (294;541)	North	-97 (-212;21)	338 (184;499)			235	post-flowering	-99 (-221;11)	315 (182;449)	North	-77 (-235;75)	318 (204;473)	435
			post-flowering-relieved	-143 (-214;-78)	373 (257;452)	South	-67 (-189;8)	385 (240;481)			920	post-flowering-relieved	-69 (-168;20)	287 (197;366)	South	-79 (-159;37)	297 (207;398)	300
			no stress	56 (-46;143)	348 (197;449)							no stress	55 (-7;123)	249 (130;391)				
	-0.05	pre-flowering	37 (0;51)	-75 (-127;-15)	Central	34 (-10;51)	-128 (-160;-61)	-130		-0.05	pre-flowering	262 (94;467)	-326 (-310;-109)	Central	94 (-35;214)	-174 (-267;-85)	540	
		smaller canopy	flowering	126 (43;159)	-189 (-223;-129)	FarSouth	-3 (-116;97)	-184 (-254;-113)			-965	flowering	321 (214;435)	-211 (-270;-106)	FarSouth	-39 (-309;124)	-368 (-506;-136)	-2425
			post-flowering	61 (-5;119)	-207 (-286;-129)	North	56 (-14;140)	-184 (-248;-102)			-80	post-flowering	107 (-57;265)	-194 (-277;-74)	North	103 (-51;292)	-184 (-273;-56)	625
			post-flowering-relieved	44 (10;80)	-145 (-180;-101)	South	34 (0;81)	-146 (-194;-84)			-220	post-flowering-relieved	80 (-53;184)	-194 (-284;-86)	South	152 (-46;310)	-221 (-270;-91)	1175
			no stress	-32 (-77;16)	-140 (-203;-79)							no stress	-61 (-163;36)	-249 (-359;-87)				
c_pHn_infection_ratio & p_pHn_prod_coef	0.1	pre-flowering	-73 (-58;0)	100 (9;378)	Central	-30 (-77;15)	137 (80;232)	235	c_pHn_infection_ratio&p_pHn_prod_coefLowTR	0.1	pre-flowering	-68 (-102;0)	129 (40;165)	Central	-17 (-51;30)	109 (48;167)	290	
		initial vigor	flowering	-135 (-220;0)	228 (89;334)	FarSouth	-22 (-128;121)	269 (146;359)			1015	flowering	-73 (-103;-2)	172 (109;207)	FarSouth	29 (-33;90)	158 (78;212)	1225
			post-flowering	-81 (-166;-8)	255 (169;347)	North	-55 (-111;6)	202 (116;315)			185	post-flowering	1 (-62;65)	153 (90;219)	North	-13 (-79;57)	170 (110;248)	655
			post-flowering-relieved	-84 (-130;-37)	240 (160;321)	South	-46 (-135;2)	270 (126;361)			660	post-flowering-relieved	1 (-36;41)	149 (101;192)	South	-14 (-57;37)	155 (105;186)	565
			no stress	53 (-24;114)	206 (99;268)							no stress	30 (-3;67)	127 (59;195)				
	-0.1	pre-flowering	2 (0;0)	-4 (-5;-1)	Central	9 (0;4)	-14 (-11;-2)	65		-0.1	pre-flowering	162 (7;252)	-71 (-137;38)	Central	56 (-9;103)	-67 (-117;-19)	505	
		later vigor	flowering	12 (0;6)	-15 (-13;-3)	FarSouth	-1 (-8;4)	-9 (-14;-4)			-60	flowering	163 (111;216)	-78 (-108;-35)	FarSouth	31 (-93;126)	-119 (-164;-40)	-130
			post-flowering	8 (0;7)	-15 (-15;-6)	North	4 (-1;4)	-13 (-13;-5)			-5	post-flowering	78 (12;151)	-68 (-129;-19)	North	74 (-17;188)	-77 (-120;-13)	725
			post-flowering-relieved	4 (-1;5)	-11 (-14;-2)	South	3 (-1;4)	-10 (-14;-2)			-5	post-flowering-relieved	54 (-15;116)	-79 (-115;-29)	South	69 (-6;137)	-76 (-105;-26)	655
			no stress	-1 (-5;3)	-11 (-14;-3)							no stress	-17 (0;0)	-93 (-151;-29)				
leaf_app_rate&leaf_app_rate2	0.1	pre-flowering	-86 (-68;0)	-2 (-37;183)	Central	-113 (-239;0)	158 (4;314)	-905	leaf_app_rate&leaf_app_rate2LowTR	0.1	pre-flowering	-117 (-188;0)	179 (70;246)	Central	-85 (-147;0)	189 (72;263)	-330	
		slower leaf appearance +5 days to flowering	flowering	-225 (-393;0)	183 (-13;373)	FarSouth	-112 (-248;39)	243 (156;295)			-465	flowering	-167 (-261;-59)	216 (125;303)	FarSouth	-57 (-132;-8)	155 (74;244)	-80
			post-flowering	-299 (-373;-192)	225 (162;292)	North	-162 (-317;0)	237 (113;331)			-1245	post-flowering	-149 (-261;-41)	211 (100;271)	North	-73 (-157;3)	224 (114;300)	25
			post-flowering-relieved	-245 (-336;-164)	260 (164;365)	South	-202 (-347;-16)	255 (106;421)			-1755	post-flowering-relieved	-97 (-183;-13)	199 (140;271)	South	-99 (-224;10)	263 (126;374)	-170
			no stress	-19 (-114;69)	259 (99;362)							no stress	-2 (-84;67)	219 (44;352)				
	-0.1	pre-flowering	66 (0;37)	-18 (-105;107)	Central	78 (0;188)	-120 (-191;31)	570		-0.1	pre-flowering	154 (59;275)	-220 (-185;44)	Central	105 (0;208)	-131 (-209;-36)	920	
		faster leaves appearance -5 days to flowering	flowering	205 (61;328)	-92 (-183;30)	FarSouth	85 (0;188)	-36 (-110;95)			1095	flowering	258 (147;343)	-155 (-212;-79)	FarSouth	58 (-15;181)	-249 (-260;-58)	-375
			post-flowering	196 (91;286)	-44 (-131;55)	North	114 (0;215)	-89 (-173;43)			1265	post-flowering	217 (25;325)	-154 (-249;-64)	North	164 (23;254)	-137 (-194;-35)	1775
			post-flowering-relieved	111 (33;187)	-64 (-122;16)	South	131 (0;239)	-78 (-201;23)			1575	post-flowering-relieved	93 (-26;210)	-181 (-279;-72)	South	139 (-24;272)	-236 (-335;-82)	905
			no stress	20 (-75;134)	-124 (-245;43)							no stress	13 (-68;94)	-213 (-297;-43)				
sw_def_leaf	0.1	pre-flowering	5 (0;1)	-17 (-22;-5)	Central	10 (-4;14)	-43 (-54;-15)	-65	sw_def_leafLowTR	0.1	pre-flowering	140 (104;254)	-194 (-186;270)	Central	64 (-21;111)	-96 (-151;-53)	480	
		response to wetter soil	flowering	28 (0;44)	-44 (-59;-13)	FarSouth	2 (-27;34)	-49 (-83;-17)			-215	flowering	194 (125;274)	-111 (-144;-52)	FarSouth	10 (-165;127)	-197 (-276;-45)	-835
			post-flowering	30 (3;50)	-74 (-93;-33)	North	16 (-13;40)	-67 (-88;-15)			-95	post-flowering	101 (18;182)	-86 (-165;-10)	North	82 (-10;220)	-101 (-147;-19)	725
			post-flowering-relieved	15 (2;27)	-40 (-62;-21)	South	10 (-2;25)	-34 (-60;-15)			-20	post-flowering-relieved	64 (-30;126)	-105 (-156;-32)	South	83 (-23;178)	-105 (-135;-41)	720
			no stress	-9 (-27;6)	-43 (-69;-17)							no stress	-30 (-79;25)	-129 (-206;-48)				
	-0.1	pre-flowering	-34 (-36;0)	53 (10;115)	Central	-11 (-36;0)	60 (19;94)	135		-0.1	pre-flowering	39 (0;67)	38 (19;71)	Central	19 (0;33)	16 (0;33)	365	
		response to dryer soil	flowering	-54 (-74;0)	96 (38;130)	FarSouth	-9 (-54;48)	124 (62;159)			485	flowering	55 (31;77)	24 (6;50)	FarSouth	23 (0;54)	4 (0;37)	365
			post-flowering	-29 (-72;-4)	107 (65;151)	North	-12 (-41;16)	76 (39;128)			200	post-flowering	49 (23;64)	32 (3;49)	North	31 (0;66)	13 (-2;52)	530
			post-flowering-relieved	-35 (-58;-15)	99 (59;130)	South	-29 (-60;0)	114 (54;149)			135	post-flowering-relieved	26 (6;50)	20 (4;47)	South	31 (2;58)	25 (0;48)	590
			no stress	18 (-17;37)	90 (35;117)							no stress	-1 (-5;9)	-2 (-6;16)				
max TR	0.1	pre-flowering	-40 (-48;0)	-13 (-50;-5)	Central	-13 (-19;0)	-13 (-25;0)	-260	max TR	0.1	pre-flowering	64 (0;93)	199 (157;240)	Central	52 (0;96)	62 (-7;139)	1090	
		reduced TE&higher Tr during midday	flowering	-31 (-38;-16)	-17 (-33;-3)	FarSouth	-23 (-35;0)	-15 (-25;0)			-420	flowering	148 (60;245)	129 (60;193)	FarSouth	95 (0;171)	78 (0;180)	1815
			post-flowering	-29 (-39;-7)	-22 (-35;-2)	North	-21 (-45;0)	-11 (-32;10)			-370	post-flowering	135 (64;196)	151 (59;219)	North	110 (4;219)	114 (2;222)	2220
			post-flowering-relieved	-18 (-35;-2)	-10 (-29;4)	South	-23 (-36;0)	-10 (-35;5)			-395	post-flowering-relieved	103 (6;169)	115 (-7;183)	South	96 (6;155)	168 (15;222)	2280
			no stress	-6 (-8;1)	-7 (-13;2)							no stress	31 (-4;52)	52 (-7;85)				
	-0.1	pre-flowering	39 (0;76)	36 (13;70)	Central	20 (0;33)	16 (0;35)	380		-0.1	pre-flowering	52 (0;99)	-102 (-185;-49)	Central	-1 (-28;21)	-48 (-92;-14)	-255	
		increased TE&lower Tr during midday	flowering	57 (34;80)	22 (7;41)	FarSouth	32 (0;60)	17 (0;37)			565	flowering	15 (-12;47)	-84 (-143;-50)	FarSouth	-23 (-54;1)	-55 (-123;0)	-620
			post-flowering	53 (25;65)	31 (3;50)	North	44 (1;66)	31 (-1;53)			815	post-flowering	-40 (-105;10)	-63 (-121;-55)	North	-19 (-59;18)	-72 (-132;-5)	-645
			post-flowering-relieved	27 (6;52)	19 (3;47)	South	32 (4;62)	22 (-1;49)			590	post-flowering-relieved	-26 (-64;-2)	-35 (-91;-9)	South	-10 (-48;33)	-42 (-103;17)	-360
			no stress	8 (-3;11)	12 (-6;16)							no stress	-18 (-31;4)	-30 (-47;6)				
K1	0.1	pre-flowering	-109 (-149;0)	128 (7;196)	Central	-31 (-29;9)	51 (6;68)	-210	K1LowTR	0.1	pre-flowering	64 (0;93)	199 (157;240)	Central	52 (0;96)	62 (-7;139)	1090	
		faster water exhaustion rate	flowering	-200 (-326;0)	237 (42;363)	FarSouth	14 (-36;56)	54 (6;121)			480	flowering	148 (60;245)	129 (60;193)	FarSouth	95 (0;171)	78 (0;180)	1815
			post-flowering	-104 (-121;-24)	178 (111;207)	North	25 (-15;29)	18 (-5;56)			465	post-flowering	135 (64;196)	151 (59;219)	North	110 (4;219)	114 (2;222)	2220
			post-flowering-relieved	-105 (-97;-23)	190 (101;200)	South	-25 (-40;15)	78 (7;108)			15	post-flowering-relieved	103 (6;169)	115 (-7;183)	South	96 (6;155)	168 (15;222)	2280
			no stress	25 (-16;63)	129 (37;158)							no stress	31 (-4;52)	52 (-7;85)				
	-0.1	pre-flowering	-5 (0;0)	17 (-29;26)	Central	-68 (-80;0)	127 (26;172)	-385		-0.1	pre-flowering	52 (0;99)	-102 (-185;-49)	Central	-1 (-28;21)	-48 (-92;-14)	-255	
		slower water exhaustion rate	flowering	36 (0;78)	7 (-48;31)	FarSouth	-30 (-91;60)	175 (77;214)			425	flowering	15 (-12;47)	-84 (-143;-50)	FarSouth	-23 (-54;1)	-55 (-123;0)	-620
			post-flowering	4 (-38;24)	68 (17;100)	North	-52 (-99;11)	130 (36;192)			-130	post-flowering	-40 (-105;10)	-63 (-121;-55)	North	-19 (-59;18)	-72 (-132;-5)	-645
			post-flowering-relieved	-33 (-59;-7)	90 (23;111)	South	-111 (-121;2)	225 (76;297)			-540	post-flowering-relieved	-26 (-64;-2)	-35 (-91;-9)	South	-10 (-48;33)	-42 (-103;17)	-360
			no stress	6 (-23;29)	61 (20;99)							no stress	-18 (-31;4)	-30 (-47;6)				