APPENDICES

Appendix 1: Climate requirement for maize crop by Sys et al. (1993)

Climatic Characteristics of the maize crop cycle	Class, degree of limitation and rating scale					
	S1		S2	S3	N	
	0	1	2	3	4	
	100	95	85	60	40	25
Insolation						
mean n	8.5+	8.1	7.3	5.2	3.5	2.3-
Temperature						
Mean temperature (^{0}C)						
opt. day temp. range 20-30 ^{0}C	22-26	21.4 28.0	20.3 32.0+	17.3	15.0-	
opt. day temp. range 25-35 ^{0}C	27-31	26.4 33.0	25.3 37.0+	22.3	20.0-	
Rainfall						
total rainfall (mm)						
early var.	450+	428	383	270	180+	
medium var.	500+	475	425	300	200-	
late var.	600+	570	510	360	240-	
Rel.air humidity						
mean RH (%) pre-ripening	75-	83	100			
mean RH (%) ripening (grain maize only)	60-	64	71	90+		

Appendix 2: Topographical and soil requirement for maize crop (Sys et al.1993)

Landscape and soil characteristics for maize	Class, degree of limitation and rating scale					
	S1		S2	S3		N
	0	1	2	3		4
	100	95	85	60	40	25
Topography (t)						
Slope (%)						
High level managem	0	1.3	3.8	10.0	15.0	19.0+
Low level managem	0	2.5	7.5	20.0	30.0	38.0+
Wetness (w)						
Flooding	F0	-	-	F1	-	F2+
Drainage	good imperfect	moderate moderate	imperfect good	poor and aeric	poor, but drainable	poor, not drainable
Clayey and loamy s	g	m	i	pa	p	vp
Sandy soils	i	m	g	pa	p	vp
Physical soil characteristics (s)						
Texture/structure	C-s Co,CL, SiCs, SiCL, SiL, Si	C+s C-v SC SCL L	C+v SL LS	LcS fS		Cm, S
Coarse fragm.(vol%						
Quarz	0	0	11	38	59	
Iron oxides	0	5	16	43	35	
Rock fragments	10-	15	25	50	70	
Soil depth (cm)	100+	93	80	47	20	
$CaCO_3$(%)	5-	8	15	23	30	35
Gypsum (%)	0	2	5	13	20	25
Soil fertility characteristics (f)						
Apparent CEC (cmol(+)/kg clay)	24+	21	16(-)	16(+)	1.5	
Sum of basic cation (cmol(+)/kg clay)	6+	5.6	4.9	3.0		
Base saturation (%)	>80	80-50	50-35	35-20	<20	-
pH (H_2O) (0-25 cm)	5.8-6.5	6.7 5.7	7.1 5.6	8.2 5.2	9.7 4.7	
Organic carbon (%) (0-25cm)						
Kaolinitic material	2.0+	1.9	1.6	1.0-		
Calcareous material	0.8+	0.7	0.6	0.4-		
Other material	1.2+	1.1	1.0	0.6-		
Salinity and Alkalinity (n)						
Ece (mmhos/cm) mean 0-100cm	1.7-	2.1	3.0	5.0	6.7	8.0
ESP (%) Ma.0-100 cm	0	5	15	20	25	

Appendix 3: Evaluation of soil quality according to Landon (1984)

Physiological deepness[cm]	extreme shallow	very shallow	shallow	medium	deep	very deep
Root depth	Limitation					
Very good	no limitation, good structure, 0 – 2% coarse fragment, bulk density 1					
Good	2 – 15% coarse fragment, bulk density 2					
Moderate	unfavourable structure (coarse prismatic, coarse blocky), 14 – 40% coarse fragment, bulk density 3, 4					
Low	Limitation, very unfavourable structure (plattig, very coarse prismatic, very coarse blocky), 40 – > 80% coarse fragment, bulk density 5					
Air capacity[Vol.-%]	very low	low	medium	high	very high	
	<2	2-<4	4-<12	12-<20	>20	
Available field capapcity[mm]	very low	low	medium	high	very high	
	<50	50-90	90-140	140-200	>200	
pH (H_2O)	low		medium	high	very high	
	<5.0		5.5-7.0	7.0-8.5	>8.5	
	very low		low	medium	high	very high
CECpot mol_c/kgsoil]	<5		5-15	15-25	25-40	>40
Corg [%]	<2		2-4	4-10	10-20	>20
Nitrogen, total[%]	<0.1		0.1-0.2	0.2-0.5	0.5-1.0	>1.0
	low		medium		high	
Exchangeable Ca [$cmol_c$/kg]	<4		4-10		>10	
Exchangeable Mg [$cmol_c$/kg]	<0.5		0.5-4		>4	
Exchangeable K [$cmol_c$/kg]	<0.2		0.2-0.6		>0.6	
Exchangeable Na [$cmol_c$/kg]	<1				>1	
Available P_2O_5[ppm]	<15		15-50		>50	
Base saturation[%]	<20		20-60		>60	

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