Global field experiments for potato simulations

Rubí Raymundo[1]*, Senthold Asseng[1], Rishi Prasad[1], Ulrich Kleinwechter[2], Bruno Condori[3], Walter Bowen[10], Joost Wolf[4], Jørgen E. Olesen[5], Qiaoxue Dong[6], Lincoln Zotarelli[1], Manuel Gastelo[3], Ashok Alva[7], Maria Travasso[8] and Vijay Arora[9]

[1] *Agricultural and Biological Engineering Department, University of Florida, Gainesville, Florida, USA.*
[2] *International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria.*
[3] *International Potato Center (CIP), Lima, Peru.*
[4] *Plant Production Systems Group, Wageningen University, The Netherlands.*
[5] *Department of Agroecology, Aarhus University, Tjele, Denmark.*
[6] *China Agricultural University, Beijing, China.*
[7] *United States Department of Agriculture-Agricultural Research Service (USDA-ARS), Sidney, MT.*
[8] *Instituto de Clima y Agua (INTA), Los Reseros y Las Cabañas, Castelar, Argentina.*
[9] *Department of Soil Science, Punjab Agricultural University, Ludhiana, India.*
[10] *Institute of Food and Agricultural Sciences (IFAS), University of Florida, Gainesville, Florida, USA.*
*e-mail: raymundo@umn.edu

Abstract: A large field potato experimental dataset has been assembled for simulation modeling. The data are from temperate, subtropical, and tropical regions across the world and include 87 experiments with 204 treatments. Treatments include nitrogen fertilizer, irrigation, atmospheric CO_2 levels, temperature, cultivars, and locations. For all experiments, measurements include tuber fresh and dry weight. For some experiments, measurements include in-season biomass, leaf area index, stem and leaf weight, N uptake, soil water, and soil N contents. Each experiment has soil characteristics and daily data for solar radiation, rainfall, and maximum and minimum temperature. The data have been quality checked and used in a previous simulation exercise. All data are in AGMIP format.

Keywords: potato, field experimental data, SUBSTOR-potato, simulations.

1 EXPERIMENTAL POTATO DATASETS: A set of 87 field experiments with 204 treatments and 32 cultivars, 3 species, and 12 soil types has been assembled. These datasets have been quality checked and used in a previous model performance test of the SUBSTOR-potato model (Raymundo et al., 2017).

Experiments include information on sowing date, harvest date, and detailed treatment descriptions. Some experiments also include emergence date. Treatments include nitrogen fertilizer, irrigation, atmospheric CO_2 levels (Open Top Chambers - OTC and Free-Air-CO_2-Enrichment - FACE), temperature, cultivars, and locations (Table 1).

Table 1. Potato field experimental sites and treatments - sorted alphabetically by country name. Modified after Raymundo et al. (2017)

Location	Year	№ tr*	Sowing date DOY	Emergence date DOY	Harvest date DOY	N application kg ha^{-1}**	Irrigation mm	Rainfall mm	Type of irrigation -	CO_2 ppm	Cultivar
Argentina, Balcarce	1991	1	298	n.a.	64	0	113	540	Mixed	Default	Spunta
		2	298	n.a.	64	60(1)	113	540	Mixed	Default	Spunta
		3	298	n.a.	64	120(1)	113	540	Mixed	Default	Spunta
		4	298	n.a.	64	160(1)	113	540	Mixed	Default	Spunta
Australia	1970	1	222	273	356	425(2)	n.a.	219	Full	Default	Sebago
		2	222	273	356	425(2)	n.a.	219	Full	Default	Sebago
		3	222	273	356	425(2)	n.a.	219	Full	Default	Sebago
Belgium, Tervuren	1998+	1[N]	127	135	257	205(2)	373	423	Mixed	380	Bintje
		2[N]	127	135	257	205(2)	373	423	Mixed	386	Bintje
		3[N]	127	135	257	205(2)	373	423	Mixed	676	Bintje
	1999+	1[N]	131	144	250	220(2)	182	204	Full	365	Bintje
		2[N]	131	144	250	220(2)	181	204	Full	370	Bintje
		3[N]	131	144	250	220(2)	183	204	Mixed	664	Bintje
Bolivia, Belen	1997	1	288	316	84	110(1)	n.a.	264	Full	Default	Waycha
		2	288	316	84	110(1)	n.a.	264	Full	Default	Lucky
Bolivia, Chinoli	1997	1	301	340	62	124(1)	n.a.	275	Full	Default	Desiree
Bolivia, Koari	1997	1	281	329	111	100(1)	-	540	Rainfed	Default	Waycha
		2	281	329	111	100(1)	-	540	Rainfed	Default	Alpha
		3	281	329	111	100(1)	-	540	Rainfed	Default	Lucky
Bolivia, Patacamaya	1997	1[N]	300	351	112	110(1)	n.a.	341	Full	Default	Waycha
		2[N]	300	351	112	110(1)	n.a.	341	Full	Default	Lucky
Bolivia, Patacamaya	1998-1	1	292	347	110	110(1)	n.a.	334	Full	Default	Waycha
		2	292	347	110	110(1)	n.a.	334	Full	Default	Lucky
Bolivia, Patacamaya	1998-2	1[N]	292	342	110	110(1)	n.a.	334	Full	Default	Waycha
		2[N]	292	342	110	110(1)	n.a.	334	Full	Default	Lucky
Bolivia, Toralapa	1993	1[N]	295	351	103	120(1)	n.a.	440	Full	Default	Waycha
		2[N]	295	351	103	120(1)	n.a.	440	Full	Default	Alpha
		3[N]	295	351	103	120(1)	n.a.	440	Full	Default	Lucky
		4[N]	295	351	103	120(1)	-	440	Rainfed	Default	Waycha
		5[N]	295	351	103	120(1)	-	440	Rainfed	Default	Alpha
		6[N]	295	351	103	120(1)	-	440	Rainfed	Default	Lucky
China, Huhhot	1996	1	118	n.a.	250	150(2)	n.a.	252	Full	Default	Desiree
China, Huhhot	1998	1	115	n.a.	253	150(2)	n.a.	470.9	Full	Default	Desiree
China, Jining	1999	1	119	n.a.	234	74(2)	n.a.	156	Full	Default	Desiree
		2	119	n.a.	234	74(2)	n.a.	156	Full	Default	Kexin 1
		3	119	n.a.	234	74(2)	n.a.	156	Full	Default	Jinguan
China, Zhalan	1997	1	119	n.a.	253	180(2)	n.a.	89	Full	Default	Desiree
China, Zhalan	1998	1	119	n.a.	242	90(2)	-	754	Rainfed	Default	Kexin 1
		2	119	n.a.	242	90(2)	-	754	Rainfed	Default	Neishu 7
Colombia, Cundinamarca	1999	1	119	143	262	100(1)	-	392	Rainfed	Default	Capiro
Denmark, Jyndevad	1981	1	119	149	225	155(1)	169	431	Mixed	Default	Bintje
	1982	1	119	148	236	155(1)	222	521	Mixed	Default	Bintje
	1983	1	122	148	215	155(1)	156	370	Mixed	Default	Bintje
Denmark, Jyndevad	1990	1	107	n.a.	267	180 (1)	107	499	Mixed	Default	Bintje
		2	107	n.a.	267	180 (4)	104	499	Mixed	Default	Bintje
		3	107	n.a.	267	180 (4)	105	499	Mixed	Default	Bintje
	1991	1	101	149	273	180 (1)	137	390	Mixed	Default	Bintje
		2	101	149	273	180 (3)	137	390	Mixed	Default	Bintje
		3	101	149	273	180 (3)	137	390	Mixed	Default	Bintje
	1992	1	100	139	224	180 (1)	231	195	Mixed	Default	Bintje
		2	100	139	224	180 (3)	231	195	Mixed	Default	Bintje
		3	100	139	224	180 (4)	231	195	Mixed	Default	Bintje
	1993	1	110	133	263	180 (1)	70	350	Mixed	Default	Bintje
		2	110	133	263	180 (3)	70	350	Mixed	Default	Bintje
		3	110	133	263	180 (4)	70	350	Mixed	Default	Bintje
Denmark, Jyndevad	1984	1	117	151	278	150(1)	71	519	Mixed	Default	Tilva
		2	117	151	278	200(1)	71	519	Mixed	Default	Tilva
	1985	1	119	149	270	150(1)	27	465	Mixed	Default	Tilva
		2	119	149	270	200(1)	27	465	Mixed	Default	Tilva
	1986	1	118	146	293	150(1)	186	488	Mixed	Default	Tilva
		2	118	146	293	200(1)	186	488	Mixed	Default	Tilva
Denmark, Tylstrup	1981	1	120	155	272	140(1)	25	405	Mixed	Default	Bintje
		2	120	152	272	140(1)	25	405	Mixed	Default	Sava
		3	120	149	272	140(1)	25	405	Mixed	Default	Posmo
		4	120	150	272	140(1)	25	405	Mixed	Default	Kaptah
		5	120	145	272	140(1)	25	405	Mixed	Default	Dianella
	1982	1	109	149	270	180(1)	185	607	Mixed	Default	Bintje
		2	109	155	270	180(1)	185	607	Mixed	Default	Sava
		3	109	152	270	180(1)	185	607	Mixed	Default	Posmo
		4	109	152	270	180(1)	185	607	Mixed	Default	Kaptah
		5	109	149	298	180(1)	185	607	Mixed	Default	Dianella
	1983	1	109	154	298	160(2)	135	566	Mixed	Default	Bintje
		2	109	154	298	160(2)	135	566	Mixed	Default	Sava
		3	109	150	298	160(2)	135	566	Mixed	Default	Posmo
		4	109	154	298	160(2)	135	566	Mixed	Default	Kaptah

Table 1. Continued

Location	Year	№ tr*	Sowing date DOY	Emergence date DOY	Harvest date DOY	N application kg ha^{-1}**	Irrigation mm	Rainfall mm	Type of irrigation -	CO_2 ppm	Cultivar
Denmark, Tylstrup	1983	5	109	149	298	160(2)	135	566	Mixed	Default	Dianella
Ecuador, San Gabriel	1985	1	45	76	241	168(2)	-	426	Rainfed	Default	INIAP-maria
		2	45	76	241	117(1)	-	426	Rainfed	Default	INIAP-gabriela
		3	45	76	241	168(2)	-	426	Rainfed	Default	INIAP-maria
		4	45	76	241	117(1)	-	426	Rainfed	Default	INIAP-gabriela
Finland, Jokioinen	1998+	1	152	163	270	80(2)	-	329	Full	375	Bintje
	1999+	1	149	159	264	80(2)	-	122	Full	550	Bintje
Germany, Giessen	1998+	1[N]	124	134	250	150(2)	67	365	Mixed	373	Bintje
		2[N]	124	134	250	150(2)	67	365	Mixed	541	Bintje
		3[N]	124	134	250	150(2)	67	365	Mixed	690	Bintje
	1999+	1[N]	130	147	258	116(2)	152	267	Full	380	Bintje
		2[N]	130	147	258	116(2)	152	267	Full	541	Bintje
		3[N]	130	147	258	116(2)	148	267	Full	708	Bintje
Germany, Giessen	1998++	1[N]	125	135	257	150(2)	186	417	Mixed	401	Bintje
		2[N]	125	135	257	150(2)	186	417	Mixed	429	Bintje
	1999++	1	130	145	239	156(2)	128	250	Full	374	Bintje
		2	130	145	239	156(2)	126	250	Full	491	Bintje
India, Ludhiana	2008	1	290	n.a.	29	0	80	18	Mixed	Default	Kufri Bahar
		2	290	n.a.	29	136(2)	80	18	Mixed	Default	Kufri Bahar
		3	290	n.a.	29	180(2)	80	18	Mixed	Default	Kufri Bahar
		4	290	n.a.	29	224(2)	80	18	Mixed	Default	Kufri Bahar
		5	290	n.a.	29	0	160	18	Mixed	Default	Kufri Bahar
India, Ludhiana	2008	6	290	n.a.	29	136(2)	160	18	Mixed	Default	Kufri Bahar
		7	290	n.a.	29	180(2)	160	18	Mixed	Default	Kufri Bahar
		8	290	n.a.	29	224(2)	160	18	Mixed	Default	Kufri Bahar
		9	290	n.a.	29	0	200	18	Mixed	Default	Kufri Bahar
		10	290	n.a.	29	136(2)	200	18	Mixed	Default	Kufri Bahar
		11	290	n.a.	29	180(2)	200	18	Mixed	Default	Kufri Bahar
		12	290	n.a.	29	224(2)	200	18	Mixed	Default	Kufri Bahar
	2010	1	285	n.a.	29	0	80	32	Mixed	Default	Kufri Bahar
		2	285	n.a.	29	136(2)	80	32	Mixed	Default	Kufri Bahar
		3	285	n.a.	29	180(2)	80	32	Mixed	Default	Kufri Bahar
		4	285	n.a.	29	224(2)	80	32	Mixed	Default	Kufri Bahar
		5	285	n.a.	29	0	160	32	Mixed	Default	Kufri Bahar
		6	285	n.a.	29	136(2)	160	32	Mixed	Default	Kufri Bahar
		7	285	n.a.	29	180(2)	160	32	Mixed	Default	Kufri Bahar
		8	285	n.a.	29	224(2)	160	32	Mixed	Default	Kufri Bahar
		9	285	n.a.	29	0	200	32	Mixed	Default	Kufri Bahar
		10	285	n.a.	29	136(2)	200	32	Mixed	Default	Kufri Bahar
		11	285	n.a.	29	180(2)	200	32	Mixed	Default	Kufri Bahar
		12	285	n.a.	29	224(2)	200	32	Mixed	Default	Kufri Bahar
India, Modipuran	2002	1	288	n.a.	3	181(2)	n.a.	0	Full	Default	Kufri Bahar
	2003	1	299	n.a.	18	181(2)	n.a.	30	Full	Default	Kufri Bahar
	2004	1	293	n.a.	11	181(2)	n.a.	0	Full	Default	Kufri Bahar
	2005	1	289	n.a.	8	181(2)	n.a.	1	Full	Default	Kufri Bahar
	2006	1	294	n.a.	13	181(2)	n.a.	0	Full	Default	Kufri Bahar
	2007	1	298	n.a.	17	181(2)	n.a.	0	Full	Default	Kufri Bahar
	2008	1	290	n.a.	8	181(2)	n.a.	12	Full	Default	Kufri Bahar
	2009	1	302	n.a.	21	181(2)	n.a.	0	Full	Default	Kufri Bahar
Ireland, Carlow	1998	1[N]	128	138	280	250(2)	61	343	Full	372	Bintje
		2[N]	128	138	280	250(2)	31	343	Full	693	Bintje
	1999	1[N]	140	152	249	250(2)	89	392	Full	372	Bintje
		2[N]	140	152	249	250(2)	91	392	Full	670	Bintje
Italy, Rapolano	1998++	1	141	149	237	240(2)	309	554	Full	366	Bintje
		2	141	149	237	240(2)	294	554	Full	552	Bintje
		3	141	149	237	240(2)	285	554	Full	367	Bintje
	1999++	1	126	147	237	250(2)	462	146	Mixed	367	Bintje
		2	126	147	237	250(2)	462	146	Mixed	552	Bintje
		3	126	147	237	250(2)	462	146	Mixed	367	Bintje
Peru, La Molina	2003	1	181	n.a.	314	310(2)	450	0	Irrigated	Default	Amarilis
	2004	1	177	n.a.	307	310(2)	350	0	Irrigated	Default	Amarilis
	2005	1	164	n.a.	281	298(2)	450	0	Irrigated	Default	Amarilis
	2006	1	186	n.a.	319	310(2)	350	0	Irrigated	Default	Amarilis
	2007	1	152	n.a.	275	350(2)	400	0	Irrigated	Default	Amarilis
	2008	1	182	n.a.	294	235(2)	350	0	Irrigated	Default	Amarilis
	2009	1	183	n.a.	292	235(2)	400	0	Irrigated	Default	Amarilis
	2010	1	196	n.a.	307	227(2)	350	0	Irrigated	Default	Amarilis
Peru, La Molina	2013	1	179	200	288	210(2)	215	14	Full	Default	Achirana
		2	179	198	288	210(2)	215	14	Full	Default	Atlantic
		3	179	198	288	210(2)	215	14	Full	Default	Sarnav
Peru, La Molina	1985	1	30	60	122	160(2)	449	3	Irrigated	Default	DTO-33
		2	30	60	130	160(2)	480	3	Irrigated	Default	LT1
		3	30	60	144	160(2)	485	3	Irrigated	Default	Revolucion
		4	176	206	285	160(2)	315	1	Irrigated	Default	DTO-33
		5	176	206	291	160(2)	257	1	Irrigated	Default	LT1

Table 1. Continued

Location	Year	№ tr*	Sowing date DOY	Emergence date DOY	Harvest date DOY	N application kg ha^{-1}**	Irrigation mm	Rainfall mm	Type of irrigation -	CO_2 ppm	Cultivar
Peru, La Molina	1985	6	176	206	274	160(2)	272	1	Irrigated	Default	Revolucion
Peru, San Ramon	1984	1	109	122	199	200(2)	n.a.	336	Full	Default	DTO-33
		2	109	126	199	200(2)	n.a.	336	Full	Default	Desiree
		3	109	128	199	200(2)	n.a.	336	Full	Default	Revolucion
Peru, San Ramon	2013	1	213	228	301	300(2)	449	303	Mixed	Default	Achirana
		2	213	228	301	300(2)	449	303	Mixed	Default	Atlantic
		3	213	228	301	300(2)	449	303	Mixed	Default	Sarnav
Scotland, Dundee	1984	1[N]	104	150	268	0	187	202	Mixed	Default	Maris piper
		2[N]	104	150	268	240(1)	187	202	Mixed	Default	Maris piper
	1985	1[N]	114	154	262	0	15	373	Mixed	Default	Maris piper
		2[N]	114	154	262	240(1)	15	373	Mixed	Default	Maris piper
	1986	1[N]	135	166	266	175(1)	91	200	Mixed	Default	Maris piper
	1987	1[N]	119	155	258	175(1)	39	346	Mixed	Default	Maris piper
Sweden, Goteborg	1998+	1[N]	145	154	252	88(2)	480	357	Mixed	708	Bintje
		2[N]	145	155	252	88(2)	480	357	Mixed	404	Bintje
Uganda, Kalengyere	2004	1	61	n.a.	169	100(1)	-	294	Rainfed	Default	Asante
	2005	1	80	n.a.	189	100(1)	-	318	Rainfed	Default	Asante
	2006	1	82	n.a.	186	100(1)	-	399	Rainfed	Default	Asante
	2009	1	273	n.a.	355	120(1)	-	501	Rainfed	Default	Asante
United Kingdom, Sutton	1998+	1[N]	126	136	239	110(2)	98	251	Full	379	Bintje
		2[N]	126	136	239	110(2)	97	251	Full	563	Bintje
		3[N]	126	136	239	110(2)	99	251	Full	673	Bintje
	1999+	1[N]	132	144	249	250(2)	131	247	Full	399	Bintje
		2[N]	132	144	249	250(2)	134	247	Full	543	Bintje
		3[N]	132	144	249	250(2)	132	247	Full	694	Bintje
United States, Benton	2003	1	87	110	231	324(9)	666	164	Mixed	Default	Russet Burbank
		2	87	110	231	669(5)	666	164	Mixed	Default	Russet Burbank
United States, Hastings	2011	1	12	43	108	168(3)	n.a.	255	Full	Default	Atlantic
		2	12	43	108	224(3)	n.a.	258	Full	Default	Atlantic
		3	19	45	117	168(3)	n.a.	258	Full	Default	Atlantic
		4	19	45	117	224(3)	n.a.	258	Full	Default	Atlantic
		5	20	45	116	168(3)	n.a.	258	Full	Default	Atlantic
		6	20	45	116	224(3)	n.a.	258	Full	Default	Atlantic
United States, New York	1980	1	143	157	257	275(2)	209	297	Full	Default	Kathadin
United States, Oregon	1988	1	105	129	264	367(10)	669	136	Full	Default	Russet Burbank
		2	89	115	174	354(15)	580	123	Full	Default	Russet Burbank
		3	98	118	174	433(16)	687	136	Full	Default	Russet Burbank
		4	117	134	264	349(15)	644	136	Full	Default	Russet Burbank
		5	75	105	221	771(17)	598	123	Full	Default	Russet Burbank
		6	81	114	250	375(11)	669	123	Full	Default	Russet Burbank
		7	107	131	174	375(11)	605	123	Full	Default	Russet Burbank
		8	91	120	174	175(7)	686	135	Full	Default	Russet Burbank
		9	116	136	264	375(11)	686	136	Full	Default	Russet Burbank
		10	98	125	174	375(11)	740	136	Full	Default	Russet Burbank
United States, Suwanee	2010	1	41	74	140	265(4)	281	758	Mixed	Default	Red Lasoda
	2011	1	28	57	118	278(5)	297	537	Mixed	Default	Red Lasoda
		2	43	62	140	285(5)	291	558	Mixed	Default	Red Lasoda
	2012	1	31	51	123	285(5)	349	320	Mixed	Default	Red Lasoda
		2	50	69	141	248(4)	343	356	Mixed	Default	Red Lasoda
	2013	1	45	65	140	248(4)	287	448	Mixed	Default	Red Lasoda
United States, Suwanee	2001	1	46	62	141	313(5)	507	290	Mixed	Default	Red Lasoda
		2	46	62	141	280(5)	507	290	Mixed	Default	Red Lasoda
	2002	1	43	60	137	292(5)	343	481	Mixed	Default	Red Lasoda
		2	46	64	138	261(5)	272	489	Mixed	Default	Red Lasoda
	2003	1	41	64	138	278(4)	242	576	Mixed	Default	Red Lasoda

[N] Treatments with estimated initial soil N
* Number or treatments.
** Number of nitrogen applications are in parenthesis.
\+ OTC: Open Top Chambers
++ FACE: Free-Air-CO2-Enrichment, OTC: Open Top Chambers
n.a. Not available.
\- Not applicable.
Full Automatic irrigation.
Default Atmospheric CO_2 concentration was for any year used from Mauna Loa Observatory, Hawaii (Bacastow et al., 1985).

Measurements include tuber fresh and dry weight for all experiments. For some experiments, measurements also include biomass, leaf area index, stem and leaf weight, N uptake, soil water, and soil N contents (Table 2). Most experiments had in-season measurements (more than two measurements), whereas 21 experiments only had information of final tuber yield. Across all experiments a total of 14 measured variables are provided. Experiments without reference have not been published before (Table 2).

Table 2. Potato field experimental sites and measured variables - sorted alphabetically by country name. Modified after Raymundo et al. (2017).

Location	Year	lat[a]	lon[b]	alt[c]	Objective[d]	tr[e]	cult[f]	In-season sampling	Measured variables [h]	Soil Type	Reference
Argentina, Balcarce	1991	-37.8	-58.3	97	N rates	4	1	5	tu	CL	(Travasso et al., 1996)
Australia,	1970	-35.0	149.0		Radiation deficit	3	1	10	tuf,LAI	SC	(Hoogenboom et al., 2015)
Belgium, Tervuren	1998-1999	50.8	4.5	97	CO_2 OTC	1	1	2	tu,le,st,to,LAI	SiL	(De Temmerman et al., 2002)
Bolivia, Belen	1997	-16.0	-68.7	3640	Cultivar adaptation	1	3	3	tu,le	CL	(Condori et al., 2010)
Bolivia, Chinoli	1997	-19.6	-65.3	3450	Cultivar adaptation	1	1	4	tu,le,st,ro,to	SL	(Condori et al., 2010)
Bolivia, Koari	1997	-17.4	-65.6	3500	Cultivar adaptation	1	3	3	tu,le,st	CL	(Condori et al., 2010)
Bolivia, Patacamaya	1997	-17.2	-68.0	3780	Cultivar adaptation	1	2	3-4	tu,le,st,ro	SiCL	(Condori et al., 2010)
Bolivia, Patacamaya	1998 (2)	-17.2	-68.0	3780	Cultivar adaptation	1	2	3-4	tu,le,st,ro	SCL	(Condori et al., 2010)
Bolivia, Toralapa	1993	-17.5	-65.7	3430	Cultivar adaptation	2	3	7	tu,le,st,ro,	CL	(Condori et al., 2010)
China, Huhhot	1996	40.5	111.4	1065	Partitioning	1	1	6	tu,LAI	SL	(Gao et al., 2003)
China, Huhhot	1998	40.5	111.4	1065	Partitioning	1	2	6	tu,le,st,to	SL	(Liu et al., 2003b)
China, Jining	1999	41.0	113.0		Partitioning	3	3	6	tu,le,st,to	SL	(Gao et al., 2004)
China, Zhalan	1997	48.0	123.0		Various	1	1	7	tu,le,st,to	SL	(Liu et al., 2003a)
China, Zhalan	1998	48.0	123.0		Partitioning	2	2	7	tu,le,st,to	SL	(Gao et al., 2004)
Colombia, Cundinamarca	1999	4.4	-74.1		Model validation	1	1	9	tu,le,st,to,LAI	SiL	(Forero Hernandez and Garzon Montaño, 2000)
Denmark, Jyndevad	1982-1983	54.9	9.1	10	Various	3	4	5-9	tu,to	S	(Jørgensen, 1984)
Denmark, Jyndevad	1990-1993	54.9	9.1	10	N rates	4	1	6-7	tu,ro,to,tuN,roN,toN	S	(Edlefsen, 1991)
Denmark, Jyndevad	1984-1986	54.9	9.1	10	N rates	2	1	14-16	tu,to,tuN	S	(Jørgensen and Edlefsen, 1987)
Denmark, Tylstrup	1981-1983	57.2	10.0	10	Various	4	4	13-14	tu,to	S	(Bach and Nielsen, 1985)
Ecuador, San Gabriel	1985	0.6	-77.8		N rates	3	2	4	tu	SL	(Clavijo Ponce, 1999)
Finland, Jokioinen	1998-1999	60.8	23.5	84	CO_2 OTC	3	1	2	tu,le,st	SL	(De Temmerman et al., 2002)
Germany, Giessen	1998-1999	50.6	8.7	68	CO_2 OTC	1	1	2	tu,le,st,to,LAI	SL	(De Temmerman et al., 2002)
Germany, Giessen	1998-1999	50.6	8.7	68	CO_2 FACE	1	1	2	tu,le,st,to,LAI	SL	(De Temmerman et al., 2002)
India, Ludhiana	2008-2011	30.9	75.8	244	N rates and irrigation	4	1	1	tuf	SL	(Arora et al., 2013)
India, Modipuran	2002-2009	28.7	77.2	228	Various	1	1	1	tuf	L,SiCL	(Kleinwechter et al., 2016)
Ireland, Carlow	1998-1999	52.9	-6.9	57	CO_2 OTC	1	1	2	tu,le,st,to	SiC	(De Temmerman et al., 2002)
Italy, Rapolano	1998-1999	42.7	11.9	38	CO_2 FACE	1	1	2	tu,le,st,to,LAI	SL	(De Temmerman et al., 2002)
Peru, La Molina	2003-2010	-12.1	-77.0	244	Cultivar adaptation	1	1	1	tuf	SL	(Kleinwechter et al., 2016)
Peru, La Molina	2013	-12.1	-77.0	244	Cultivar adaptation	1	3	5	tu,le,st	SL	
Peru, La Molina	1985	-12.1	-77.0	244	Cultivar adaptation	2	3	5	tu,le,st,to,LAI	SL, SCL,SL	(Trebejo and Midmore, 1990)
Peru, San Ramon	1984	-11.1	-75.3	800	High temperature tolerance	1	3	4	tu,le,st,to	SL	(Nelson, 1987)
Peru, San Ramon	2013	-11.1	-75.3	800	High temperature tolerance	1	3	5	tu,le,st,to	SL	
Scotland, Dundee	1984-1985	56.5	-3.1	40	N rates	2	1	8	tu,le,st,to,LAI,de,tuN,leN,stN,toN	SL	(Marshall and Van Den Broek, 1995)
Scotland, Dundee	1986-1987	56.5	-3.1	40	Irrigation	4	1	8	tu,le,st,to,LAI,SWC	SL	(Marshall and Van Den Broek, 1995)
Sweden, Gotenborg	1998	57.9	12.4	58	CO_2 OTC	3	1	2	tu,le,st,to	SL	(De Temmerman et al., 2002)
Uganda, Kalengyere	2004-2009	-1.2	29.8	2400	Various	1	1	1	tuf	C	(Kleinwechter et al., 2016)
United Kingdom, Sutton	1998-1999	52.8	-1.3	87	CO_2 OTC	1	1	2	tu,le,st,to,LAI	SL	(De Temmerman et al., 2002)
United States, Benton	2003	45.9	-119.5		N rates	2	1	5-6	tu,le,st,to,LAI,tuN,leN,stN,toN	S	(Alva et al., 2010)
United States, Hastings	2011	29.7	-81.5	2	N rates	2	3	1	tu,le,st,tuN,leN,stN,toN,soN	S	(Zotarelli et al., 2014)
United States, New York	1980	42.4	-76.5		Various	1	1	5	tu,le,st,to	SL	(Hoogenboom et al., 2015)
United States, Oregon	1988	45.8	-119.3		Various	10		9-15	tu,le,st,to,LAI	SL	(Hoogenboom et al., 2015)

Table 2. Continued

Location	Year	lat[a]	lon[b]	alt[c]	Objective[d]	tr[e]	cult[f]	In-season sampling	Measured variables [h]	Soil Type	Reference
United States, Suwanee	2010-2013	30.1	-83.1	13.7	N mass balance	1	1	1	tuf	S	(Prasad et al., 2015)
United States, Suwanee	2001	30.1	-83.1	13.7	N mass balance	1	1	3-5	tu,le,st,soN,SWC	S	(Albert, 2002)
United States, Suwanee	2003	30.1	-83.1	13.7	N mass balance	1	1	3-5	tu,le,st,soN,SWC	S	(Warren, 2003)

[a] Latitude.
[b] Longitude.
[c] Altitude.
[d] FACE: Free-Air-CO_2-Enrichment, OTC: Open Top Chambers.
[e] number of treatments.
[f] number of cultivars.
[g] sampling repetitions.
[h] tu: tuber dry weight (kg ha^{-1}), tubf: Tuber fresh weight (kg ha^{-1}), le: Leaf dry weight (kg ha^{-1}), st: Stem dry weight (kg ha^{-1}), to: aboveground dry weight (kg ha^{-1}), LAI: leaf area index, de: dead tissue dry weight (kg ha^{-1}); tuN: tuber N uptake (kg ha^{-1}); le: Leaf N uptake (kg ha^{-1}); stN: Stem N uptake (kg ha^{-1}), toN: aboveground nitrogen uptake (kg ha^{-1}), SoN: Soil N content (ppm), SWC: Soil water content (m^3 m^{-3}).
[i] C: clay; S:sand; Si: silt; L:loam.

All experimental data were organized using the ICASA data dictionary (White et al., 2013) and AgMIP harmonized format (Table 3). Corresponding weather data and soil files are indicated for each experiment. Detailed information of a treatment (FACE and OTC) was given when weather files differed at an experimental site. Weather data include daily solar radiation, maximum and minimum temperatures, and precipitation. Soil profiles were obtained from three sources: 1) the original publication; 2) generic soil profiles based on the soil texture from reference; or 3) they were computed using the *Sbuild* tool embodied in the DSSAT-CSM (Hoogenboom et al., 2015). Methods to compute initial values are explained in (Raymundo et al., 2017). Initial soil conditions were missing in about 20% of the experiments. In these cases, initial mineral soil N was chosen by trial and error to closely reproduce one of the treatments (e.g. for N rate experiments usually the lowest N treatment). This initial N amount was then applied to all other treatments in this experiment. (Ritchie et al., 1995).

Table 3. Potato field experimental files for simulation modeling in AgMIP format.

Location	Year	Treatment[a]	Weather File	Soil Profile	Soil File	Management/measurement File
Argentina, Balcarce	1991	All	INBA9102.WTH	INBA000001[o]	IN.SOL	INBA9102_mng_fdm.xlsx
Australia,	1970	All	AUCB0001.WTH	IBPT910002[o]	SOIL.SOL	AUCB0001_mng_fdm.xlsx
Belgium, Tervuren	1998	OTC_NF_NF_98	BE019801.WTH	CHBE00001[g]	CH.SOL	CHBE9801_mng_fdm.xlsx
	1998	OTC_NF++_NF_98	BE019801.WTH	CHBE00001[g]	CH.SOL	CHBE9801_mng_fdm.xlsx
	1998	AA	BE039801.WTH	CHBE00001[g]	CH.SOL	CHBE9801_mng_fdm.xlsx
	1999	OTC_NF_NF_99	BE029901.WHT	CHBE00001[g]	CH.SOL	CHBE9801_mng_fdm.xlsx
	1999	OTC_NF++_NF_99	BE029901.WHT	CHBE00001[g]	CH.SOL	CHBE9801_mng_fdm.xlsx
	1999	AA	BE049901.WTH	CHBE00001[g]	CH.SOL	CHBE9801_mng_fdm.xlsx
Bolivia, Belen	1997	All	PRBE9701.WTH	PRTO930001[g]	PR.SOL	PRBE9701_mng_fdm.xlsx
Bolivia, Chinoli	1997	All	PRCH9701.WTH	IB00000008[g]	SOIL.SOL	PRCH9701_mng_fdm.xlsx
Bolivia, Koari	1997	All	PRKO9801.WTH	PRTO930001[g]	PR.SOL	PRKO9801_mng_fdm.xlsx
Bolivia, Patacamaya -1	1997	All	PRPA9701.WTH	PRPA980001[g]	PR.SOL	PRPA9701_mng_fdm.xlsx
Bolivia, Patacamaya - 2	1998	All	PRPT9801.WTH	PRPA980001[g]	PR.SOL	PRPT9801_mng_fdm.xlsx
Bolivia, Patacamaya - 3	1998	All	PRPT9802.WTH	PRPA980001[g]	PR.SOL	PRPT9802_mng_fdm.xlsx
Bolivia, Toralapa	1993	All	PRTO9301.WTH	PRTO930001[g]	PR.SOL	PRTO9301_mng_fdm.xlsx
China, Huhhot	1996	All	AUHU9601.WTH	IB00000009[g]	CH.SOL	AUHU9601_mng_fdm.xlsx
China, Huhhot	1998	All	AUHU9801.WTH	IB00000009[g]	CH.SOL	AUHU9801_mng_fdm.xlsx
China, Jining	1999	All	IAWM9901.WTH	IB00000009[g]	SOIL.SOL	IAWM9901_mng_fdm.xlsx
China, Zhalan	1997	All	IAHM9701.WTH	IB00000009[g]	SOIL.SOL	IAHM9701_mng_fdm.xlsx
China, Zhalan	1998	All	IAHM9801.WTH	IB00000009[g]	SOIL.SOL	IAHM9801_mng_fdm.xlsx
Colombia, Cundinamarca	1999	All	ANMG9901.WTH	AN00990001[o]	AN.SOL	ANMG9901_mng_fdm.xlsx
Denmark, Jyndevad	1982	All	DIJY8201.WTH	DIJY000002[e]	DI.SOL	DNJY8201_mng_fdm.xlsx
	1983	All	DIJY8301.WTH	DIJY000002[e]	DI.SOL	DNJY8301_mng_fdm.xlsx
Denmark, Jyndevad	1990	All	DIJY9001.WTH	DIJY000002[e]	DI.SOL	DNJY9001_mng_fdm.xlsx
	1991	All	DIJY9101.WTH	DIJY000002[e]	DI.SOL	DNJY9101_mng_fdm.xlsx
	1992	All	DIJY9201.WTH	DIJY000002[e]	DI.SOL	DNJY9201_mng_fdm.xlsx
	1993	All	DIJY9301.WTH	DIJY000002[e]	DI.SOL	DNJY9301_mng_fdm.xlsx
Denmark, Jyndevad	1984	All	DIJY8401.WTH	DIJY000002[e]	DI.SOL	DNJY8401_mng_fdm.xlsx
	1985	All	DIJY8501.WTH	DIJY000002[e]	DI.SOL	DNJY8501_mng_fdm.xlsx
	1986	All	DIJY8601.WTH	DIJY000002[e]	DI.SOL	DNJY8601_mng_fdm.xlsx
Denmark, Tylstrup	1981	All	DITY8101.WTH	DITY000002[e]	DI.SOL	DNTY8101_mng_fdm.xlsx
	1982	All	DITY8201.WTH	DITY000002[e]	DI.SOL	DNTY8201_mng_fdm.xlsx
	1983	All	DITY8301.WTH	DITY000002[e]	DI.SOL	DNTY8301_mng_fdm.xlsx
Ecuador, San Gabriel	1985	All	CISG8501.WTH	IB00000009[o]	CH.SOL	IPSG8501_mng_fdm.xlsx
Finland, Jokioinen	1998	OTC_AA_AA_98	FI019801.WTH	FIFI000001[g]	CH.SOL	CHFI9801_mng_fdm.xlsx
	1998	OTC_NF_NF_98	FI029801.WTH	FIFI000001[g]	FI.SOL	CHFI9801_mng_fdm.xlsx
	1999	OTC_NF+_NF_99	FI039901.WTH	FIFI000001[g]	FI.SOL	CHFI9801_mng_fdm.xlsx
	1999	OTC_AA_AA_99	FI049901.WTH	FIFI000001[g]	FI.SOL	CHFI9801_mng_fdm.xlsx
	1999	OTC_NF_NF_99	FI039901.WTH	FIFI000001[g]	FI.SOL	CHFI9801_mng_fdm.xlsx
Germany, Giessen	1998	OTC_NF_CF_98	GR039801.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
	1998	OTC_NF+_CF_98	GR039801.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
	1998	OTC_NF++_CF_98	GR039801.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
	1998	FACE_FACE_CF_98	GR059801.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
	1998	FACE_FACE+_CF_98	GR059801.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
Germany, Giessen	1999	OTC_NF_CF_99	GR049901.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
	1999	OTC_NF+_CF_99	GR049901.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
	1999	OTC_NF++_CF_99	GR049901.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
	1999	FACE_FACE_CF_99	GR069901.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
	1999	FACE_FACE+_CF_99	GR069901.WTH	GRGR000001[g]	GR.SOL	CHGR9801_mng_fdm.xlsx
India, Ludhiana	2008	All	PULU0801.WTH	PLLU000001[o]	PL.SOL	PULU0801_mng_fdm.xlsx
	2010	All	PULU0901.WTH	PLLU000001[o]	PL.SOL	PULU0901_mng_fdm.xlsx
India, Modipuran	2002	All	CIMO0201.WTH	CI_CLAF111[o]	CI.SOL	CIMO0201_mng_fdm.xlsx
	2003	All	CIMO0301.WTH	CI_CLAF111[o]	CI.SOL	CIMO0301_mng_fdm.xlsx
	2004	All	CIMO0401.WTH	CI_CLAF111[o]	CI.SOL	CIMO0401_mng_fdm.xlsx
	2005	All	CIMO0501.WTH	CI_CLAF111[o]	CI.SOL	CIMO0501_mng_fdm.xlsx
	2006	All	CIMO0601.WTH	CI_CLAF111[o]	CI.SOL	CIMO0601_mng_fdm.xlsx
	2007	All	CIMO0701.WTH	CI_CLAF111[o]	CI.SOL	CIMO0701_mng_fdm.xlsx

Table 3. Continued

Location	Year	Treatment[a]	Weather File	Soil Profile	Soil File	Management/measurement File
India, Modipuran	2008	All	CIMO0801.WTH	CI_CLAF111[o]	CI.SOL	CIMO0801_mng_fdm.xlsx
	2009	All	CIMO0901.WTH	CI_CLAF111[o]	CI.SOL	CIMO0901_mng_fdm.xlsx
Ireland, Carlow	1998	OTC_NF_NF_98	IE019801.WTH	IEIE000001[g]	IE.SOL	CHIE9801_mng_fdm.xlsx
	1998	OTC_NF++_NF_98	IE019801.WTH	IEIE000001[g]	IE.SOL	CHIE9801_mng_fdm.xlsx
	1999	OTC_NF_NF_99	IECA9901.WTH	IEIE000001[g]	IE.SOL	CHIE9801_mng_fdm.xlsx
	1999	OTC_NF++_NF_99	IECA9901.WTH	IEIE000001[g]	IE.SOL	CHIE9801_mng_fdm.xlsx
	1999	AA_99	IE039901.WTH	IEIE000001[g]	IE.SOL	CHIE9801_mng_fdm.xlsx
Italy, Rapolano	1998	All	IT019702.WTH	ITIT000001[g]	IT.SOL	CHRA9801_mng_fdm.xlsx
	1999	All	IT019802.WTH	ITIT000001[g]	IT.SOL	CHRA9801_mng_fdm.xlsx
Peru, La Molina	2003	All	CILM0301.WTH	CI_FLYE13A[o]	CI.SOL	CILM0301_mng_fdm.xlsx
	2004	All	CILM0401.WTH	CI_FLYE13A[o]	CI.SOL	CILM0401_mng_fdm.xlsx
	2005	All	CILM0501.WTH	CI_FLYE13A[o]	CI.SOL	CILM0501_mng_fdm.xlsx
	2006	All	CILM0601.WTH	CI_FLYE13A[o]	CI.SOL	CILM0601_mng_fdm.xlsx
	2007	All	CILM0701.WTH	CI_FLYE13A[o]	CI.SOL	CILM0701_mng_fdm.xlsx
	2008	All	CILM0801.WTH	CI_FLYE13A[o]	CI.SOL	CILM0801_mng_fdm.xlsx
	2009	All	CILM0901.WTH	CI_FLYE13A[o]	CI.SOL	CILM0901_mng_fdm.xlsx
	2010	All	CILM1001.WTH	CI_FLYE13A[o]	CI.SOL	CILM1001_mng_fdm.xlsx
Peru, La Molina	2013	All	CPLI9301.WTH	CI_FLYE13A[o]	CI.SOL	CPLI9301_mng_fdm.xlsx
Peru, La Molina	1985	All	CPLM8501.WTH	LMCP970004[o]	LM.SOL	CPLM8501_mng_fdm.xlsx
Peru, San Ramon	1984	All	CPSR8401.WTH	SRUA850001[o]	SR.SOL	CPSR8401_mng_fdm.xlsx
Peru, San Ramon	2013	All	CPLM9301.WTH	CPSR000022[e]	CH.SOL	CPSR9301_mng_fdm.xlsx
Scotland, Dundee	1984	All	SCDU8401.WTH	SCDU000001[e]	SC.SOL	SCDU8401_mng_fdm.xlsx
	1985	All	SCDU8501.WTH	SCDU000002[e]	SC.SOL	SCDU8401_mng_fdm.xlsx
Scotland, Dundee	1986	All	SCDU8601.WTH	SCDU000003[e]	SC.SOL	SCDU8401_mng_fdm.xlsx
	1987	All	SCDU8701.WTH	SCDU000003[e]	SC.SOL	SCDU8401_mng_fdm.xlsx
Sweden, Gotenborg	1998	OTC_NF++_NF_98	SE019801.WTH	SESE000001[g]	SE.SOL	CHSE9801_mng_fdm.xlsx
	1998	OTC_NF_NF_98	SE019801.WTH	SESE000001[g]	SE.SOL	CHSE9801_mng_fdm.xlsx
	1998	AA_98	SE029801.WTH	SESE000001[g]	SE.SOL	CHSE9801_mng_fdm.xlsx
Uganda, Kalengyere	2004	All	UGKA0401.WTH	CI_FRUG222[o]	CI.SOL	CIKA0401_mng_fdm.xlsx
	2005	All	UGKA0501.WTH	CI_FRUG222[o]	CI.SOL	CIKA0501_mng_fdm.xlsx
	2006	All	UGKA0601.WTH	CI_FRUG222[o]	CI.SOL	CIKA0601_mng_fdm.xlsx
	2009	All	UGKA0901.WTH	CI_FRUG222[o]	CI.SOL	CIKA0901_mng_fdm.xlsx
United Kingdom, Sutton	1998	OTC_NF_NF_98	UK019801.WTH	UKUK000001[g]	UK.SOL	CHUK9801_mng_fdm.xlsx
	1998	OTC_NF+_NF_98	UK019801.WTH	UKUK000001[g]	UK.SOL	CHUK9801_mng_fdm.xlsx
	1998	OTC_NF++_NF_98	UK019801.WTH	UKUK000001[g]	UK.SOL	CHUK9801_mng_fdm.xlsx
	1998	AA_98	UK029801.WTH	UKUK000001[g]	UK.SOL	CHUK9801_mng_fdm.xlsx
	1999	OTC_NF_NF_99	UK039901.WTH	UKUK000001[g]	UK.SOL	CHUK9801_mng_fdm.xlsx
	1999	OTC_NF+_NF_99	UK039901.WTH	UKUK000001[g]	UK.SOL	CHUK9801_mng_fdm.xlsx
	1999	OTC_NF++_NF_99	UK039901.WTH	UKUK000001[g]	UK.SOL	CHUK9801_mng_fdm.xlsx
	1999	AA_99	UK049901.WTH	UKUK000001[g]	UK.SOL	CHUK9801_mng_fdm.xlsx
United States, Benton	2003	All	USBE0301.WTH	USBE000001[e]	US.SOL	USBE0301_mng_fdm.xlsx
United States, Hastings	2011	All	UFHA1101.WTH	UHHA000004[g]	UH.SOL	UFHA1101_mng_fdm.xlsx
United States, New York	1980	All	NYCU8001.WTH	IBPT910006[o]	SOIL.SOL	NYCU8001_mng_fdm.xlsx
United States, Idaho (Oregon)	1988	All	OSBO8801.WTH	IBPT910005[o]	SOIL.SOL	OSBO8801_mng_fdm.xlsx
United States, Suwanee	2010	All	NASA1001.WTH	SF00000001[o]	SF.SOL	SFUF1001_mng_fdm.xlsx
	2011	All	NASA1101.WTH	SF00000002[o]	SF.SOL	SFUF1001_mng_fdm.xlsx
	2012	All	NASA1201.WTH	SF00000003[o]	SF.SOL	SFUF1001_mng_fdm.xlsx
	2013	All	NASA1301.WTH	SF00000004[o]	SF.SOL	SFUF1001_mng_fdm.xlsx
United States, Suwanee	2001-2003	All	SF0110004.WTH	NFSF000001[o]	NF.SOL	SF011000_mng_fdm.xlsx

[a] Treatments were indicated when weather data or soil profile varied
All: Treatments used the same weather data and/or soil profile
NF_NF: OTC or FACE ring non treated.
NF+_NF: OTC or FACE ring enriched with CO_2 (550 ppm).
NF++_NF: OTC enriched with CO_2 (680 ppm).
AA: Ambient air plot.
[e] Soil profile computed with SBuild soil parameter estimation tool available in the DSSAT-CSM (Raymundo et al., 2017).
[g] Soil profile derived from soil texture (Raymundo et al., 2017).
[o] Soil profile from publications (see Table 1).

2 ACKNOWLEDGMENTS We thank the International Research Food Policy Research Institute (IFPRI), the International Potato Center (CIP), and the USAID linkage fund project “Collaboration between the International Potato Center (CIP) and the University of Florida (UF) to better understand and prioritize climate change adaptation needs for food security in the Andes.” We also thank Cheryl Porter and Meng Zhang, University of Florida, for assistance with AgMIP data formats.

REFERENCES

Albert, M., 2002. Monitoring and modeling the fate and transport of nitrate in the vadose zone beneath a Suwanneee River Basin vegetable farm. Department of Agricultural and Biological Engineering. University of Florida, Gainesville, Florida, pp. 1-179.

Alva, A.K., Marcos, J., Stockle, C., Reddy, V.R., Timlin, D., 2010. A crop simulation model for predicting yield and fate of nitrogen in irrigated potato rotation cropping system. Journal of Crop Improvement 24, 142-152. doi: 10.1080/15427520903581239.

Arora, V.K., Nath, J.C., Singh, C.B., 2013. Analyzing potato response to irrigation and nitrogen regimes in a sub-tropical environment using SUBSTOR-Potato model. Agricultural Water Management 124, 69-76. doi: 10.1016/j.agwat.2013.03.021.

Bacastow, R.B., Keeling, C.D., Whorf, T.P., 1985. Seasonal amplitude increase in atmospheric CO_2 concentration at Mauna Loa, Hawaii,1959-1982. Journal of Geophysical Research-Atmospheres 90, 10529-10540. doi: https://doi.org/10.1029/JD090iD06p10529.

Bach, A., Nielsen, S., 1985. Vækstanalyse i kartofler 1981-83. Planteavl 89, 215-224.

Clavijo Ponce, N.L., 1999. Validación del modelo de simulacion DSSAT en el cultivo de papa (*Solanum tuberosum* L.) en las condiciones del canton Montufar provincia del Carchi. Escuela de ingenieria agronómica. Escuela superior politécnica de Chimborazo, Riobamba, Ecuador, p. 80.

Condori, B., Hijmans, R.J., Quiroz, R., Ledent, J.F., 2010. Quantifying the expression of potato genetic diversity in the high Andes through growth analysis and modeling. Field Crops Research 119, 135-144. doi: 10.1016/j.fcr.2010.07.003.

De Temmerman, L., Hacour, A., Guns, M., 2002. Changing climate and potential impacts on potato yield and quality 'CHIP': introduction, aims and methodology. European Journal of Agronomy 17, 233-242. doi: 10.1016/S1161-0301(02)00063-1

Edlefsen, O., 1991. Styring af kvælstof i vandede kartofler. The Danish Institute of Agricultural Science, Tjele, Denmark.

Forero Hernandez, D., Garzon Montaño, E., 2000. Validacion del modelo de simulacion de crecimiento "SUBSTOR-potato V.35" para cuatro variedades mejoradas de papa (*Solanum tuberosum ssp. andigena*) bajo condiciones de cultivo comercial. In: Montano, E.G. (Ed.), Facultad De Agronomia. Universidad Nacional De Colombia, Bogota, pp. 1-84.

Gao, J.L., Liu, K.L., Sheng, J.H., Ren, K., Wen, X.J., Sui, Q.J., Jiang, B., 2004. Dry matter accumulation and distribution of potato under dry farming. Potato China 18, 9-15.

Gao, J.L., Liu, K.L., Zhang, B.L., Ren, Y.Z., 2003. Accumulation and distribution of dry matter in potato. China Potato 17, 209-212.

Hoogenboom, G., Jones, J.W., Wilkens, P.W., Porter, C.H., Boote, K.J., Hunt, L.A., Singh, U., Lizaso, J.L., White, J.W., Uryasev, O., Royce, F.S., Ogoshi, R., Gijsman, A.J., Tsuji, G.Y., Koo, J., 2015. Decision Support System for Agrotechnology Transfer (DSSAT) Version 4.6 [CD-ROM]. University of Hawaii, Honolulu, Hawaii.

Jørgensen, V., 1984. Vandforsyningens indflydelse på udbytte og kvalitet af kartofler. Planteavl 88, 453-468.

Jørgensen, V., Edlefsen, O., 1987. Vandforsyningens indflydelse på udbytte og kvalitet af industrikartofler. Planteavl 91, 329-347.

Kleinwechter, U., Gastelo, M., Ritchie, J., Nelson, G., Asseng, S., 2016. Simulating cultivar variations in potato yields for contrasting environments. Agricultural Systems 145, 51-63. doi: 10.1016/j.agsy.2016.02.011.

Liu, K.L., Gao, J.L., Ren, K., Sheng, J.H., Sui, Q.J., Jiang, B., 2003a. Nitrogen absorption, accumulation and distribution of potato under dry farming. Potato China 17, 321-325.

Liu, K.L., Gao, J.L., Sun, H.Z., Sheng, J.H., 2003b. The dynamic of sink structure in potato. China Potato 17, 267-272.

Marshall, B., Van Den Broek, B.J., 1995. Field experiments and analysis of data used in the case study. Modelling and parameterization of the soil-plant-atmosphere system: A comparison of potato growth models, 179-210. url: http://library.wur.nl/WebQuery/wurpubs/302080.

Nelson, D.G., 1987. Light interception, dry matter production and partitioning of the potato crop in tropical environments. Department of Agriculture. University College of Wales, pp. 1-135.

Prasad, R., Hochmuth, G.J., Boote, K.J., 2015. Estimation of Nitrogen Pools in Irrigated Potato Production on Sandy Soil Using the Model SUBSTOR. PloS one 10, e0117891-e0117891. doi: 10.1371/journal.pone.0117891.

Raymundo, R., Asseng, S., Prassad, R., Kleinwechter, U., Concha, J., Condori, B., Bowen, W., Wolf, J., Olesen, J.E., Dong, Q.X., Zotarelli, L., Gastelo, M., Alva, A., Travasso, M., Quiroz, R., Arora, V., Graham, W., Porter, C., 2017. Performance of the SUBSTOR-potato model across contrasting growing conditions. Field Crops Research 202, 57-76. doi: 10.1016/j.fcr.2016.04.012.

Travasso, M.I., Caldiz, D.O., Saluzzo, J.A., 1996. Yield prediction using the SUBSTOR-potato model under Argentinian conditions. Potato Research 39, 305-312. doi: 10.1007/BF02360922.

Trebejo, I., Midmore, D.J., 1990. Effect of water stress on potato growth, yield and water use in a hot and a cool tropical climate. The Journal of Agricultural Science 114, 321-334. doi: 10.1017/S0021859600072713.

Warren, M.F., 2003. Monitoring and modeling water and nitrogen transport in the vadose zone of a vegetable farm in the Suwannee river basin. Department of Agricultural and Biological Engineering. University of Florida, Gainesville, Florida, pp. 1-233.

White, J.W., Hunt, L.A., Boote, K.J., Jones, J.W., Koo, J., Kim, S., Porter, C.H., Wilkens, P.W., Hoogenboom, G., 2013. Integrated description of agricultural field experiments and production: The ICASA Version 2.0 data standards. Computers and Electronics in Agriculture 96, 1-12. doi: 10.1016/j.compag.2013.04.003.

Zotarelli, L., Rens, L.R., Cantliffe, D.J., Stoffella, P.J., Gergela, D., Fourman, D., 2014. Nitrogen Fertilizer Rate and Application Timing for Chipping Potato Cultivar Atlantic. Agronomy Journal 106, 2215-2226. doi: 10.2134/agronj14.0193.