

Evaluation of Potato Fertilization and the Potential of Farmers to Reduce the Amount of FertilizerBased on Yield and the Requirements for Nutrients

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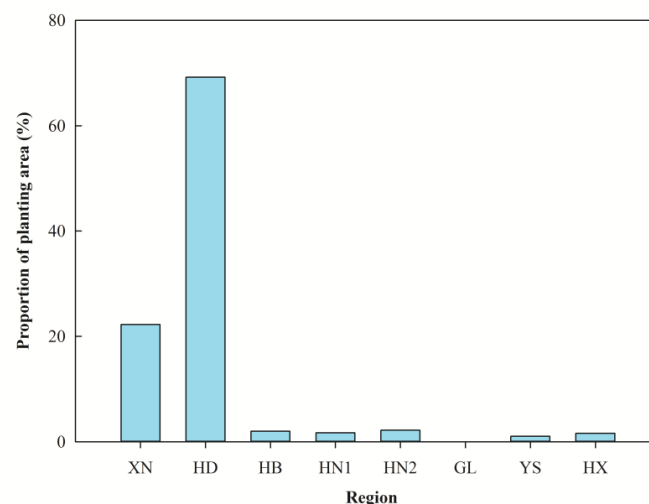


Figure S1. Distribution of potatoes in Qinghai Province.XN stands for Xining City, HD for Haidong City, HB for Haibei State, HN1 for Huangnan State, HN2 for Hainan State, GL for Guoluo State, YS for Yushu State, and HX for Haixi State.

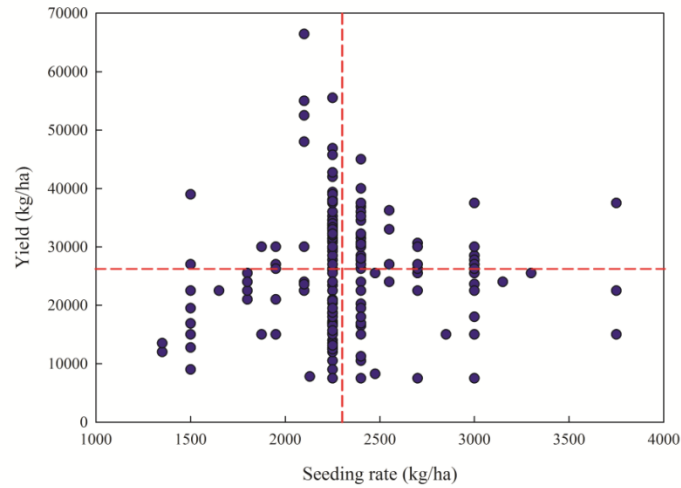


Figure S2. Seeding rate in Haidong City.

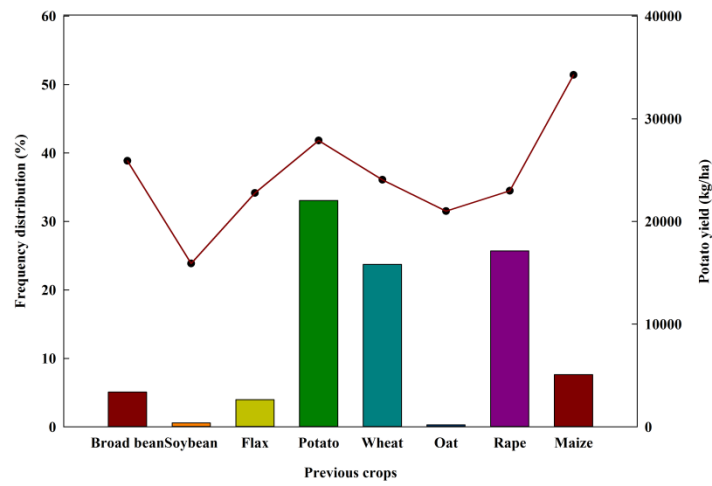


Figure S3. Proportion of previous crop and potato yield after rotation in Haidong City.

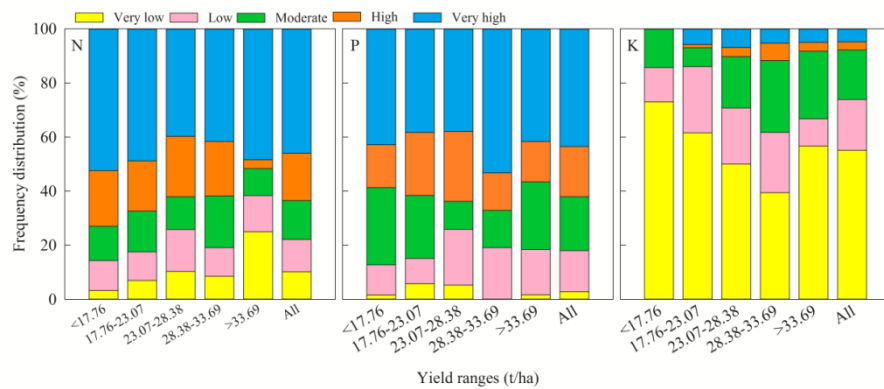


Figure S4. Relationships of potato yield to N, P₂O₅, and K₂O fertilizers.

Table S1. Nutrient requirements, yield and amount of fertilizer of the different potato varieties

Variety	Yield (kg ha ⁻¹)	Nutrient requirements (kg t ⁻¹)			Nutrient uptake (kg ha ⁻¹)			Fertilization rate (kg ha ⁻¹)		
		N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Buerbanke	22,888	1.67	2.81	8.16	38.8	64.9	188	90	90	128
Chuanyu 117	21,875	4.44	0.93	5.96	87.6	17.0	117	95	47	95
Chuanyuzao	23,199	1.74	1.01	3.19	41.1	23.3	74.8	48	24	72
Daxiyang	24,381	1.69	1.16	4.11	41.7	28.4	102	64	42	0
Dingshu No.2	26,247	2.22	1.24	4.73	58.6	32.9	125	231	97	32
Jingshi No.2	14,070	3.35	1.00	3.83	47.3	14.2	53.8	180	90	90
Kexin No.1	42,465	5.55	1.76	6.61	224	62.4	268	230	110	193
LongshuNo.1	29,479	3.78	0.77	4.70	101	21.1	129	157	70	34
LeshuNo.1	27,025	4.60	1.04	3.86	95.8	21.8	82.1	134	116	108
MinshuNo.1	22,614	4.42	3.14	12.90	95.3	61.9	250	122	122	66
QingshuNo.1	21,395	7.53	3.63	15.1	160	76.7	320	169	120	90
Xindaping	32,370	3.12	1.50	5.01	102	48.8	162	231	97	32
Zihuabai	18,795	4.68	1.24	5.06	43.5	46.4	69.6	70	40	27

Table S2. The status of N fertilization by farmers and its recommended rate

Yield ranges (kg ha ⁻¹)	Very low(kg Nha ⁻¹)				Low(kg Nha ⁻¹)				Moderate(kg Nha ⁻¹)				High(kg Nha ⁻¹)				Very high(kg Nha ⁻¹)				Mean(kg Nha ⁻¹)			
	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%
Very low <17,760	99	58	41	41	136	62	74	55	164	77	87	53	194	59	135	70	287	67	220	76	229	66	164	71
Low 17,760-23,070	94	95	-2	-2	134	98	36	27	161	102	59	37	196	104	92	47	276	101	175	63	215	101	115	53
Moderate 23,070-28,380	100	126	- 26	-26	137	124	12	9	166	126	40	24	191	127	64	34	291	125	167	57	210	125	85	40
High 28,380-33,690	96	153	- 57	-60	137	151	14	10	166	149	17	10	192	150	42	22	276	150	126	46	208	150	58	28
Very high >33,690	100	199	- 99	-99	137	204	- 67	-49	169	194	- 26	-15	209	178	30	15	284	182	102	36	204	190	14	7
Mean	98	153	- 55	-55	136	130	6	5	165	128	37	22	194	115	78	40	282	123	158	56	213	126	87	41

Note: F: Fertilizer rate used by farmers;RR: Recommended rate;R: Rec minus F;E %: The extent of reduction; N: nitrogen.

Table S3. The status of P fertilization by farmers and its recommended rate

Yield ranges (kg ha ⁻¹)	Very low (kg P ₂ O ₅ ha ⁻¹)				Low (kg P ₂ O ₅ ha ⁻¹)				Moderate (kg P ₂ O ₅ ha ⁻¹)				High (kg P ₂ O ₅ ha ⁻¹)				Very high (kg P ₂ O ₅ ha ⁻¹)				Mean (kg P ₂ O ₅ ha ⁻¹)			
	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%
Very low <17,760	45	21	24	54	95	18	77	81	130	18	112	86	176	17	159	90	285	19	265	93	198	18	180	91
Low 17,760-23,070	25	28	-3	-14	98	26	73	74	131	29	102	78	170	29	142	83	277	29	248	90	188	28	159	85
Moderate 23,070-28,380	25	34		-34	36	37	-1	-3	-	-	-	-	-	-	-	-	-	-	-	-	28	35	-7	-24
High 28,380-33,690	-	-	-	-	92	154	-61	-66	137	43	94	69	176	41	135	77	288	42	246	86	214	42	172	80
Very high >33,690	0	51	-51	-	97	58	39	40	135	54	81	60	175	55	120	68	327	50	276	85	212	53	159	75
Mean	25	32	-7	-28	94	39	54	58	133	34	98	74	174	34	139	80	292	36	256	88	202	35	167	82

Note: P: phosphorus; P₂O₅: phosphorus pentoxide; F: Fertilizer rate used by farmers; RR: Recommended rate; R: Rec minus F; E %: The extent of reduction; -: No data.

Table S4. The status of K fertilization by farmers and its recommended rate

Yield ranges (kg ha ⁻¹)	Very low (kg K ₂ O ha ⁻¹)				Low (kg K ₂ O ha ⁻¹)				Moderate (kg K ₂ O ha ⁻¹)				High (kg K ₂ O ha ⁻¹)				Very high (kg K ₂ O ha ⁻¹)				Mean (kg K ₂ O ha ⁻¹)			
	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%	F	RR	R	E%
Very low <17,760	9	93	-85	-973	49	100	-51	-104	78	97	-19	-25	-	-	-	-	-	-	-	-	24	95	-71	-299
Low 17,760-23,070	9	144	-135	-1497	43	146	-103	-236	84	147	-63	-76	150	157	-7	-5	234	157	77	33	38	145	-108	-286
Moderate 23,070-28,380	14	179	-165	-1211	41	182	-141	-345	84	182	-98	-116	128	188	-61	-48	182	181	1	0	48	180	-132	-275
High 28,380-33,690	9	218	-209	-2431	52	212	-160	-308	91	220	-129	-142	140	213	-73	-52	187	211	-24	-13	57	216	-160	-282
Very high >33,690	7	281	-273	-3716	42	287	-245	-582	90	256	-167	-186	150	260	-110	-73	233	263	-30	-13	44	274	-230	-519
Mean	9	174	-165	-1786	46	180	-134	-289	87	198	-111	-128	140	212	-71	-51	207	192	15	7	43	182	-139	-323

Note: F: Fertilizer rate used by farmers;RR: Recommended rate;R: Rec minus F;E %: The extent of reduction; K: potassium; K₂O, potassium oxide.