

# Potential and water-limited corn and soy production of different varieties, compared to the 2022 Agricultural Census

*Updated for Sep. 10, 2025*

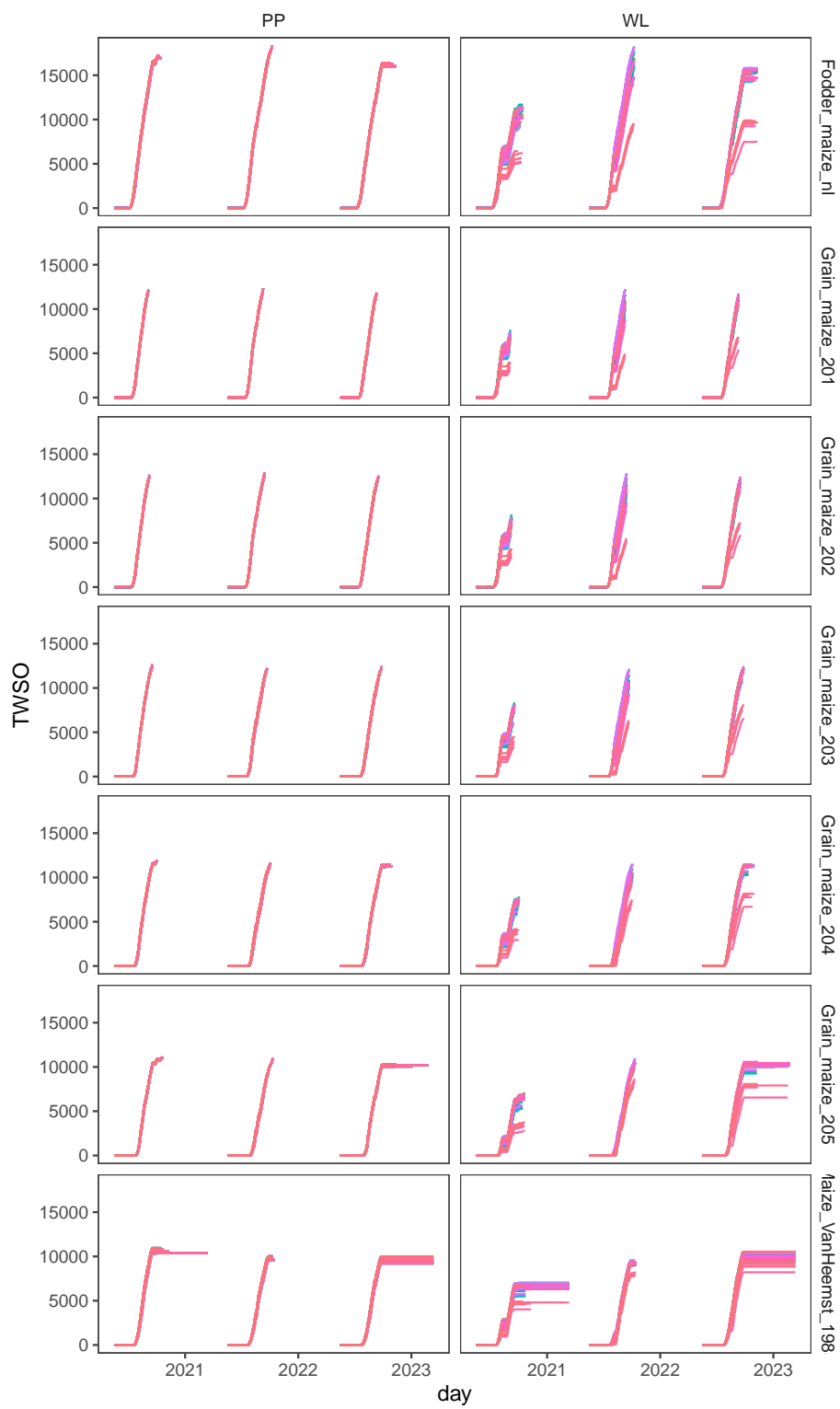
## Corn and soy production in some PA counties

### Example yield plots: North Branch Two Lick Creek-Two Lick Creek

The following curves show yield (TWSO) development for unique combinations of soil map units (mukey) and gridMET cells that had cultivation in them. TWSO is [total weight storage organs](#) and is in kg/ha. TWSO is modeled using the water limited (WL) and potential production (PP) models of WOFOST.

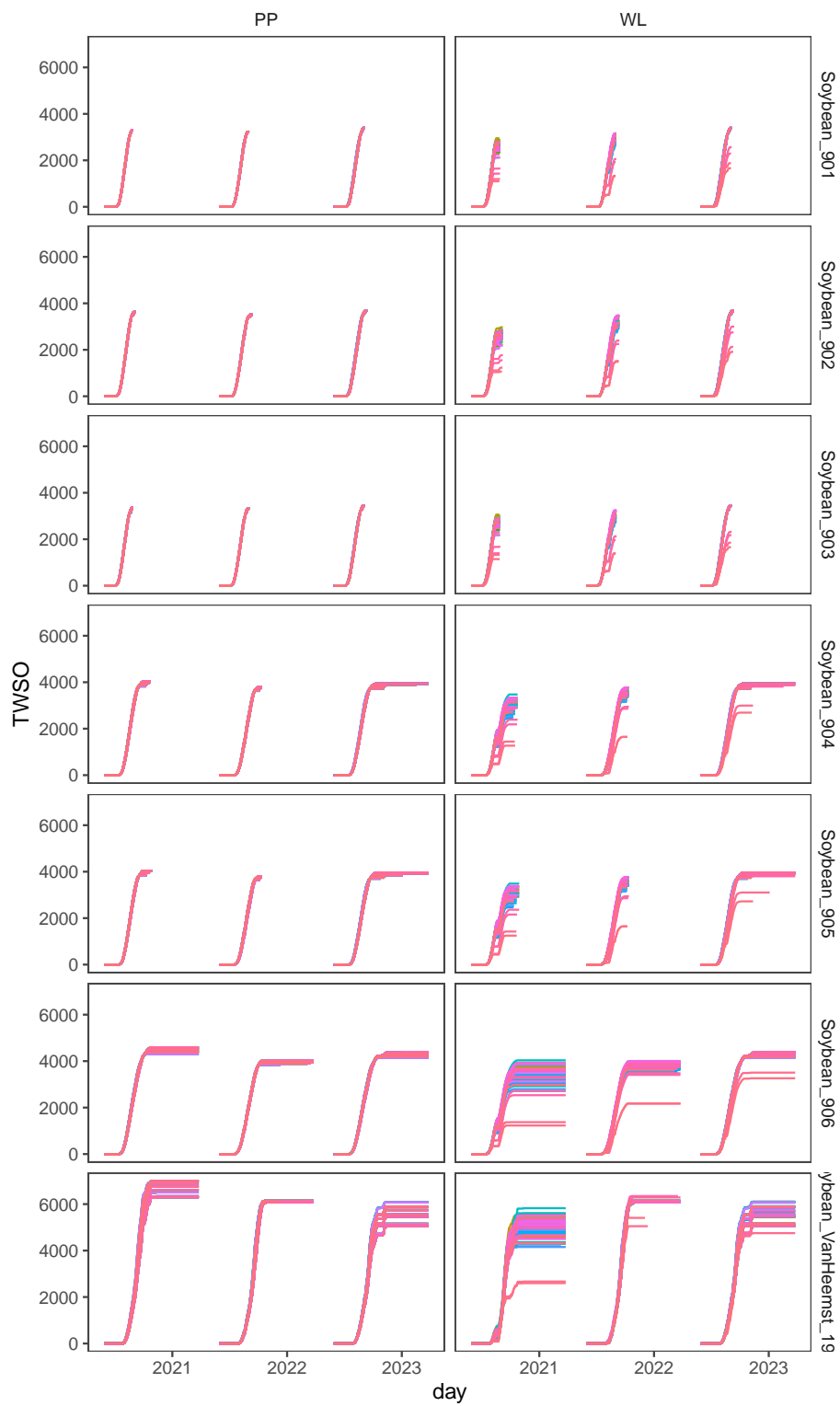


# Corn





# Soy



## Calculated harvest for each watershed

The ‘total.area’ value in the following two tables are the number of cultivated pixels according to the crop sequence boundary. Pixels are  $30 \times 30 \text{m} = 900 \text{ sqm}$ . The ‘wt.TWSO’ value is a weighted average of TWSO at harvest time across the cultivated pixels in the watershed. The weighting is by the number of pixels for each modeled yield value (i.e., the curves shown in the last section).

I used conversion factors [here](#) to convert from kg to bushels for corn and soy. These values were  $1 \text{ kg corn} = 0.039368 \text{ bushel}$  and  $1 \text{ kg soy} = 0.0367437 \text{ bushel}$ . The conversion from pixel to acre was  $1 \text{ ha} = 2.47105 \text{ acre}$ .

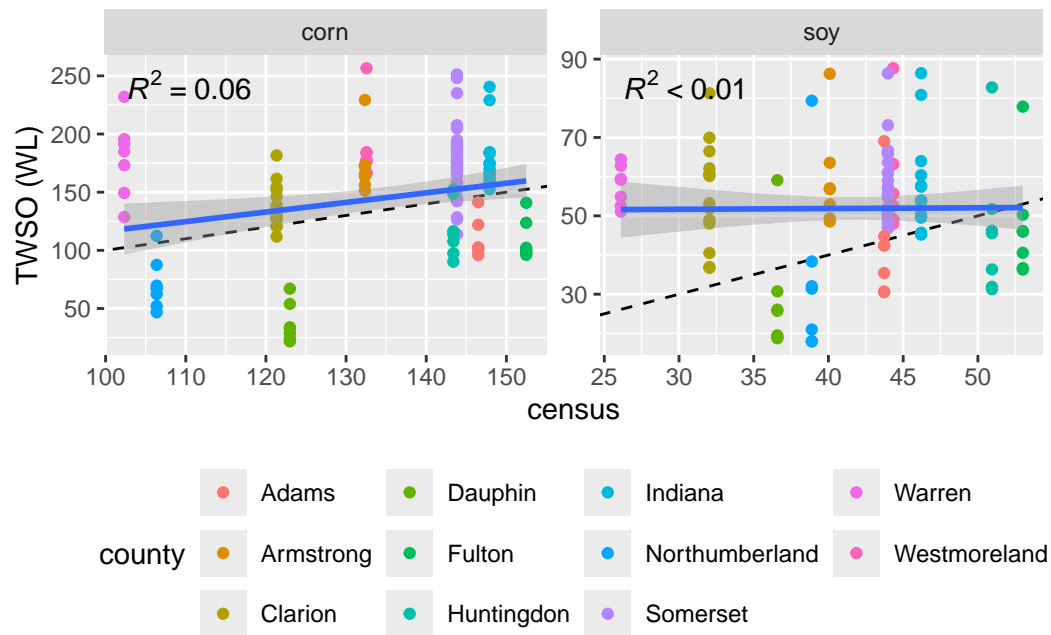
## Compare to census

### Census data

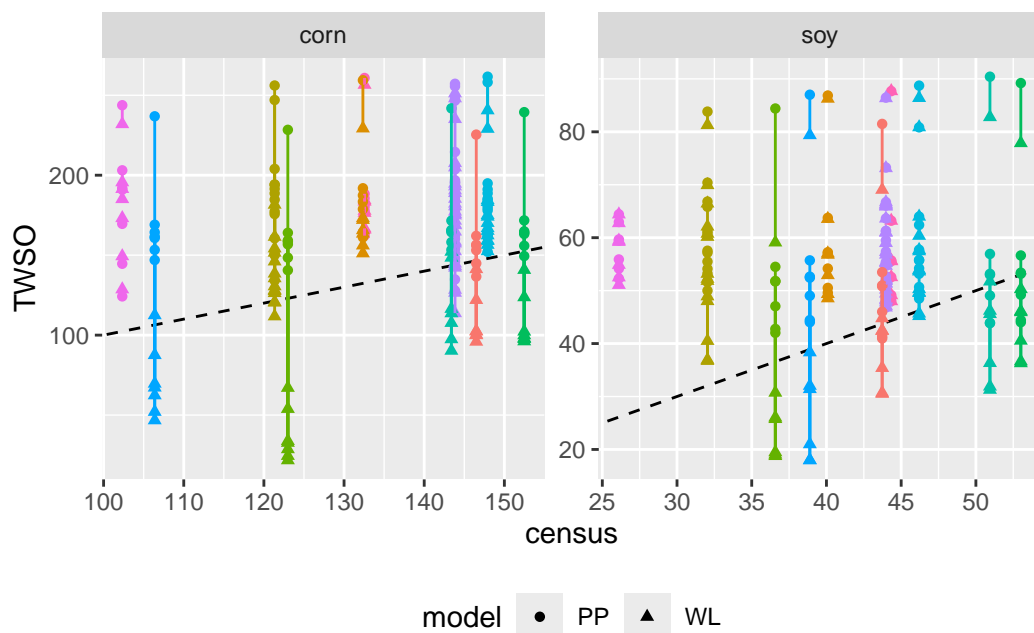
Bushels per acre for each county was calculated by dividing the harvested quantity by harvested acres in the county for 2022, from the [ag census](#).

county	corn.census	soy.census
Adams	146.49	43.73
Armstrong	132.35	40.09
Clarion	121.34	32.04
Dauphin	122.99	36.58
Fulton	152.48	53.01
Huntingdon	143.39	50.94
Indiana	147.91	46.20
Northumberland	106.38	38.89
Somerset	143.84	43.98
Warren	102.33	26.11
Westmoreland	132.56	44.34

## Comparing water limited (WL) to census yields



## Comparing water limited (WL) and potential production (PP) results to census yields



county	variety	bshl_acr.WL	bshl_acr.PP	crop	census	watershed
Indiana	Fodder_maize_nl	240.61	258.16	corn	147.91	NBTLCLC
Indiana	Grain_maize_201	174.08	185.33	corn	147.91	NBTLCLC
Indiana	Grain_maize_202	183.32	194.91	corn	147.91	NBTLCLC
Indiana	Grain_maize_203	184.44	191.13	corn	147.91	NBTLCLC
Indiana	Grain_maize_204	175.10	179.52	corn	147.91	NBTLCLC
Indiana	Grain_maize_205	158.93	162.30	corn	147.91	NBTLCLC
Indiana	Maize_VanHeemst_1988	156.49	152.09	corn	147.91	NBTLCLC
Westmoreland	Fodder_maize_nl	256.59	260.80	corn	132.56	HndC
Westmoreland	Grain_maize_201	176.48	180.30	corn	132.56	HndC
Westmoreland	Grain_maize_202	184.40	188.38	corn	132.56	HndC
Westmoreland	Grain_maize_203	183.49	185.57	corn	132.56	HndC
Westmoreland	Grain_maize_204	177.79	177.90	corn	132.56	HndC
Westmoreland	Grain_maize_205	166.01	164.70	corn	132.56	HndC
Westmoreland	Maize_VanHeemst_1988	166.78	162.21	corn	132.56	HndC
Clarion	Fodder_maize_nl	161.53	256.10	corn	121.34	BR-C
Clarion	Grain_maize_201	111.77	184.74	corn	121.34	BR-C
Clarion	Grain_maize_202	120.79	193.98	corn	121.34	BR-C
Clarion	Grain_maize_203	127.57	188.66	corn	121.34	BR-C
Clarion	Grain_maize_204	126.33	177.30	corn	121.34	BR-C
Clarion	Grain_maize_205	120.37	160.56	corn	121.34	BR-C
Clarion	Maize_VanHeemst_1988	130.58	150.02	corn	121.34	BR-C
Somerset	Fodder_maize_nl	235.15	246.63	corn	143.84	LS-C



county	variety	bshl_acr.WL	bshl_acr.PP	crop	census	watershed
Somerset	Grain_maize_201	194.73	203.64	corn	143.84	LS-C
Somerset	Grain_maize_202	204.94	214.52	corn	143.84	LS-C
Somerset	Grain_maize_203	188.91	196.80	corn	143.84	LS-C
Somerset	Grain_maize_204	169.20	176.51	corn	143.84	LS-C
Somerset	Grain_maize_205	142.25	148.21	corn	143.84	LS-C
Somerset	Maize_VanHeemst_1988	126.52	127.83	corn	143.84	LS-C
Somerset	Fodder_maize_nl	207.60	247.72	corn	143.84	BffC
Somerset	Grain_maize_201	164.83	194.95	corn	143.84	BffC
Somerset	Grain_maize_202	175.79	205.95	corn	143.84	BffC
Somerset	Grain_maize_203	168.79	195.74	corn	143.84	BffC
Somerset	Grain_maize_204	152.45	178.03	corn	143.84	BffC
Somerset	Grain_maize_205	128.36	153.87	corn	143.84	BffC
Somerset	Maize_VanHeemst_1988	113.77	134.81	corn	143.84	BffC
Somerset	Fodder_maize_nl	251.23	255.57	corn	143.84	SGCR
Somerset	Grain_maize_201	180.60	182.96	corn	143.84	SGCR
Somerset	Grain_maize_202	193.06	195.43	corn	143.84	SGCR
Somerset	Grain_maize_203	190.57	192.38	corn	143.84	SGCR
Somerset	Grain_maize_204	177.33	178.90	corn	143.84	SGCR
Somerset	Grain_maize_205	158.52	160.15	corn	143.84	SGCR
Somerset	Maize_VanHeemst_1988	144.84	146.12	corn	143.84	SGCR
Somerset	Fodder_maize_nl	248.12	257.18	corn	143.84	HPLR
Somerset	Grain_maize_201	174.88	178.61	corn	143.84	HPLR
Somerset	Grain_maize_202	185.30	189.06	corn	143.84	HPLR
Somerset	Grain_maize_203	182.27	186.11	corn	143.84	HPLR
Somerset	Grain_maize_204	171.63	175.63	corn	143.84	HPLR
Somerset	Grain_maize_205	157.42	162.45	corn	143.84	HPLR
Somerset	Maize_VanHeemst_1988	143.27	154.68	corn	143.84	HPLR
Adams	Fodder_maize_nl	141.31	225.39	corn	146.49	UpMC
Adams	Grain_maize_201	95.93	156.25	corn	146.49	UpMC
Adams	Grain_maize_202	102.44	162.06	corn	146.49	UpMC
Adams	Grain_maize_203	100.00	153.11	corn	146.49	UpMC
Adams	Grain_maize_204	100.34	144.89	corn	146.49	UpMC
Adams	Grain_maize_205	102.42	136.62	corn	146.49	UpMC
Adams	Maize_VanHeemst_1988	122.02	156.47	corn	146.49	UpMC
Warren	Fodder_maize_nl	231.97	243.77	corn	102.33	BERC
Warren	Grain_maize_201	185.09	191.98	corn	102.33	BERC
Warren	Grain_maize_202	195.61	203.06	corn	102.33	BERC
Warren	Grain_maize_203	191.42	190.94	corn	102.33	BERC
Warren	Grain_maize_204	173.20	169.59	corn	102.33	BERC
Warren	Grain_maize_205	149.36	144.62	corn	102.33	BERC
Warren	Maize_VanHeemst_1988	128.66	124.21	corn	102.33	BERC
Clarion	Fodder_maize_nl	181.58	247.03	corn	121.34	TbyC
Clarion	Grain_maize_201	138.53	191.48	corn	121.34	TbyC
Clarion	Grain_maize_202	151.62	203.94	corn	121.34	TbyC
Clarion	Grain_maize_203	154.27	194.21	corn	121.34	TbyC
Clarion	Grain_maize_204	146.10	175.69	corn	121.34	TbyC
Clarion	Grain_maize_205	135.62	151.55	corn	121.34	TbyC

county	variety	bshl_acr.WL	bshl_acr.PP	crop	census	watershed
Clarion	Maize_VanHeemst_1988	128.16	134.13	corn	121.34	TbyC
Huntingdon	Fodder_maize_nl	152.18	241.82	corn	143.39	LtTC
Huntingdon	Grain_maize_201	90.28	165.32	corn	143.39	LtTC
Huntingdon	Grain_maize_202	97.47	171.58	corn	143.39	LtTC
Huntingdon	Grain_maize_203	107.66	165.75	corn	143.39	LtTC
Huntingdon	Grain_maize_204	113.70	158.13	corn	143.39	LtTC
Huntingdon	Grain_maize_205	116.45	153.35	corn	143.39	LtTC
Huntingdon	Maize_VanHeemst_1988	148.47	164.38	corn	143.39	LtTC
Northumberland	Fodder_maize_nl	87.55	236.84	corn	106.38	SchC
Northumberland	Grain_maize_201	46.77	164.31	corn	106.38	SchC
Northumberland	Grain_maize_202	52.05	169.02	corn	106.38	SchC
Northumberland	Grain_maize_203	62.38	161.60	corn	106.38	SchC
Northumberland	Grain_maize_204	67.25	153.32	corn	106.38	SchC
Northumberland	Grain_maize_205	69.67	146.97	corn	106.38	SchC
Northumberland	Maize_VanHeemst_1988	112.48	160.75	corn	106.38	SchC
Armstrong	Fodder_maize_nl	229.29	259.38	corn	132.35	LwCC
Armstrong	Grain_maize_201	163.53	183.48	corn	132.35	LwCC
Armstrong	Grain_maize_202	172.09	191.83	corn	132.35	LwCC
Armstrong	Grain_maize_203	173.19	187.38	corn	132.35	LwCC
Armstrong	Grain_maize_204	165.66	178.81	corn	132.35	LwCC
Armstrong	Grain_maize_205	151.17	164.37	corn	132.35	LwCC
Armstrong	Maize_VanHeemst_1988	156.12	161.14	corn	132.35	LwCC
Indiana	Fodder_maize_nl	229.04	261.60	corn	147.91	HdCC
Indiana	Grain_maize_201	159.38	181.23	corn	147.91	HdCC
Indiana	Grain_maize_202	166.93	188.69	corn	147.91	HdCC
Indiana	Grain_maize_203	170.20	184.49	corn	147.91	HdCC
Indiana	Grain_maize_204	165.27	177.95	corn	147.91	HdCC
Indiana	Grain_maize_205	152.51	163.25	corn	147.91	HdCC
Indiana	Maize_VanHeemst_1988	162.43	161.03	corn	147.91	HdCC
Dauphin	Fodder_maize_nl	53.89	228.38	corn	122.99	ArmC
Dauphin	Grain_maize_201	21.76	159.18	corn	122.99	ArmC
Dauphin	Grain_maize_202	24.50	163.99	corn	122.99	ArmC
Dauphin	Grain_maize_203	28.69	156.80	corn	122.99	ArmC
Dauphin	Grain_maize_204	32.69	148.44	corn	122.99	ArmC
Dauphin	Grain_maize_205	33.84	140.59	corn	122.99	ArmC
Dauphin	Maize_VanHeemst_1988	67.06	158.45	corn	122.99	ArmC
Fulton	Fodder_maize_nl	140.83	239.42	corn	152.48	WdBC
Fulton	Grain_maize_201	98.14	164.88	corn	152.48	WdBC
Fulton	Grain_maize_202	102.22	171.75	corn	152.48	WdBC
Fulton	Grain_maize_203	99.96	164.08	corn	152.48	WdBC
Fulton	Grain_maize_204	97.61	155.88	corn	152.48	WdBC
Fulton	Grain_maize_205	96.15	149.42	corn	152.48	WdBC
Fulton	Maize_VanHeemst_1988	123.72	163.28	corn	152.48	WdBC
Indiana	Soybean_901	49.56	49.86	soy	46.20	NBTLCLC
Indiana	Soybean_902	53.95	54.21	soy	46.20	NBTLCLC
Indiana	Soybean_903	50.29	50.68	soy	46.20	NBTLCLC
Indiana	Soybean_904	57.45	57.47	soy	46.20	NBTLCLC

county	variety	bshl_acr.WL	bshl_acr.PP	crop	census	watershed
Indiana	Soybean_905	57.69	57.72	soy	46.20	NBTLCLC
Indiana	Soybean_906	63.99	63.98	soy	46.20	NBTLCLC
Indiana	Soybean_VanHeemst_1988	80.87	80.84	soy	46.20	NBTLCLC
Westmoreland	Soybean_901	48.01	48.01	soy	44.34	HndC
Westmoreland	Soybean_902	52.56	52.56	soy	44.34	HndC
Westmoreland	Soybean_903	49.14	49.14	soy	44.34	HndC
Westmoreland	Soybean_904	55.57	55.57	soy	44.34	HndC
Westmoreland	Soybean_905	55.69	55.69	soy	44.34	HndC
Westmoreland	Soybean_906	63.21	63.21	soy	44.34	HndC
Westmoreland	Soybean_VanHeemst_1988	87.69	87.69	soy	44.34	HndC
Clarion	Soybean_901	36.73	50.00	soy	32.04	BR-C
Clarion	Soybean_902	40.51	54.12	soy	32.04	BR-C
Clarion	Soybean_903	36.93	51.60	soy	32.04	BR-C
Clarion	Soybean_904	52.24	57.17	soy	32.04	BR-C
Clarion	Soybean_905	53.19	57.54	soy	32.04	BR-C
Clarion	Soybean_906	62.11	65.84	soy	32.04	BR-C
Clarion	Soybean_VanHeemst_1988	81.29	83.82	soy	32.04	BR-C
Somerset	Soybean_901	50.20	50.20	soy	43.98	LS-C
Somerset	Soybean_902	54.69	54.69	soy	43.98	LS-C
Somerset	Soybean_903	51.83	51.83	soy	43.98	LS-C
Somerset	Soybean_904	66.34	66.34	soy	43.98	LS-C
Somerset	Soybean_905	66.71	66.71	soy	43.98	LS-C
Somerset	Soybean_906	66.23	66.24	soy	43.98	LS-C
Somerset	Soybean_VanHeemst_1988	51.97	52.11	soy	43.98	LS-C
Somerset	Soybean_901	48.18	48.65	soy	43.98	BffC
Somerset	Soybean_902	52.17	52.70	soy	43.98	BffC
Somerset	Soybean_903	49.47	50.02	soy	43.98	BffC
Somerset	Soybean_904	60.95	61.19	soy	43.98	BffC
Somerset	Soybean_905	61.05	61.29	soy	43.98	BffC
Somerset	Soybean_906	65.90	66.19	soy	43.98	BffC
Somerset	Soybean_VanHeemst_1988	59.00	59.51	soy	43.98	BffC
Somerset	Soybean_901	47.13	47.17	soy	43.98	SGCR
Somerset	Soybean_902	51.34	51.40	soy	43.98	SGCR
Somerset	Soybean_903	48.35	48.39	soy	43.98	SGCR
Somerset	Soybean_904	56.81	56.89	soy	43.98	SGCR
Somerset	Soybean_905	57.31	57.39	soy	43.98	SGCR
Somerset	Soybean_906	65.98	66.07	soy	43.98	SGCR
Somerset	Soybean_VanHeemst_1988	73.15	73.25	soy	43.98	SGCR
Somerset	Soybean_901	46.82	46.82	soy	43.98	HPLR
Somerset	Soybean_902	51.39	51.39	soy	43.98	HPLR
Somerset	Soybean_903	47.78	47.78	soy	43.98	HPLR
Somerset	Soybean_904	55.22	55.22	soy	43.98	HPLR
Somerset	Soybean_905	55.42	55.42	soy	43.98	HPLR
Somerset	Soybean_906	63.63	63.64	soy	43.98	HPLR
Somerset	Soybean_VanHeemst_1988	86.37	86.45	soy	43.98	HPLR
Adams	Soybean_901	30.51	40.97	soy	43.73	UpMC
Adams	Soybean_902	35.40	46.01	soy	43.73	UpMC

county	variety	bshl_acr.WL	bshl_acr.PP	crop	census	watershed
Adams	Soybean_903	30.71	41.36	soy	43.73	UpMC
Adams	Soybean_904	42.46	50.98	soy	43.73	UpMC
Adams	Soybean_905	42.42	50.82	soy	43.73	UpMC
Adams	Soybean_906	44.80	53.48	soy	43.73	UpMC
Adams	Soybean_VanHeemst_1988	69.06	81.49	soy	43.73	UpMC
Warren	Soybean_901	51.09	52.26	soy	26.11	BERC
Warren	Soybean_902	54.88	55.89	soy	26.11	BERC
Warren	Soybean_903	52.51	54.16	soy	26.11	BERC
Warren	Soybean_904	59.22	59.43	soy	26.11	BERC
Warren	Soybean_905	59.45	59.66	soy	26.11	BERC
Warren	Soybean_906	62.76	62.97	soy	26.11	BERC
Warren	Soybean_VanHeemst_1988	64.40	64.42	soy	26.11	BERC
Clarion	Soybean_901	48.03	51.73	soy	32.04	TbyC
Clarion	Soybean_902	51.85	55.49	soy	32.04	TbyC
Clarion	Soybean_903	48.93	53.23	soy	32.04	TbyC
Clarion	Soybean_904	60.17	60.80	soy	32.04	TbyC
Clarion	Soybean_905	60.75	61.21	soy	32.04	TbyC
Clarion	Soybean_906	66.47	66.83	soy	32.04	TbyC
Clarion	Soybean_VanHeemst_1988	69.94	70.40	soy	32.04	TbyC
Huntingdon	Soybean_901	31.89	43.93	soy	50.94	LtTC
Huntingdon	Soybean_902	36.34	49.07	soy	50.94	LtTC
Huntingdon	Soybean_903	31.28	43.85	soy	50.94	LtTC
Huntingdon	Soybean_904	45.58	53.17	soy	50.94	LtTC
Huntingdon	Soybean_905	46.21	52.99	soy	50.94	LtTC
Huntingdon	Soybean_906	51.73	56.93	soy	50.94	LtTC
Huntingdon	Soybean_VanHeemst_1988	82.79	90.41	soy	50.94	LtTC
Northumberland	Soybean_901	18.00	44.04	soy	38.89	SchC
Northumberland	Soybean_902	20.99	49.03	soy	38.89	SchC
Northumberland	Soybean_903	17.96	44.43	soy	38.89	SchC
Northumberland	Soybean_904	31.41	52.64	soy	38.89	SchC
Northumberland	Soybean_905	32.03	52.45	soy	38.89	SchC
Northumberland	Soybean_906	38.36	55.72	soy	38.89	SchC
Northumberland	Soybean_VanHeemst_1988	79.38	87.01	soy	38.89	SchC
Armstrong	Soybean_901	48.56	49.59	soy	40.09	LwCC
Armstrong	Soybean_902	52.94	54.17	soy	40.09	LwCC
Armstrong	Soybean_903	49.37	50.52	soy	40.09	LwCC
Armstrong	Soybean_904	56.79	57.08	soy	40.09	LwCC
Armstrong	Soybean_905	57.04	57.25	soy	40.09	LwCC
Armstrong	Soybean_906	63.55	63.75	soy	40.09	LwCC
Armstrong	Soybean_VanHeemst_1988	86.26	86.86	soy	40.09	LwCC
Indiana	Soybean_901	45.20	48.51	soy	46.20	HdCC
Indiana	Soybean_902	49.70	53.19	soy	46.20	HdCC
Indiana	Soybean_903	45.69	49.16	soy	46.20	HdCC
Indiana	Soybean_904	53.63	55.73	soy	46.20	HdCC
Indiana	Soybean_905	53.82	55.77	soy	46.20	HdCC
Indiana	Soybean_906	60.36	62.41	soy	46.20	HdCC
Indiana	Soybean_VanHeemst_1988	86.40	88.73	soy	46.20	HdCC

county	variety	bshl_acr.WL	bshl_acr.PP	crop	census	watershed
Dauphin	Soybean_901	18.77	42.03	soy	36.58	ArmC
Dauphin	Soybean_902	19.48	47.06	soy	36.58	ArmC
Dauphin	Soybean_903	19.05	42.77	soy	36.58	ArmC
Dauphin	Soybean_904	25.76	51.82	soy	36.58	ArmC
Dauphin	Soybean_905	26.04	51.72	soy	36.58	ArmC
Dauphin	Soybean_906	30.73	54.50	soy	36.58	ArmC
Dauphin	Soybean_VanHeemst_1988	59.11	84.41	soy	36.58	ArmC
Fulton	Soybean_901	36.66	44.03	soy	53.01	WdBC
Fulton	Soybean_902	40.56	49.23	soy	53.01	WdBC
Fulton	Soybean_903	36.30	44.43	soy	53.01	WdBC
Fulton	Soybean_904	45.95	53.39	soy	53.01	WdBC
Fulton	Soybean_905	46.12	53.19	soy	53.01	WdBC
Fulton	Soybean_906	50.29	56.64	soy	53.01	WdBC
Fulton	Soybean_VanHeemst_1988	77.88	89.21	soy	53.01	WdBC