

Crop Production Show 2019



**Agri-ARM Research Update
January 17, 2019**

**Influence of Wide or Narrow
Row Production on Dry Bean
Yield & Moving Production
Beyond Irrigation!**

**Garry Hnatowich
ICDC Research Director**

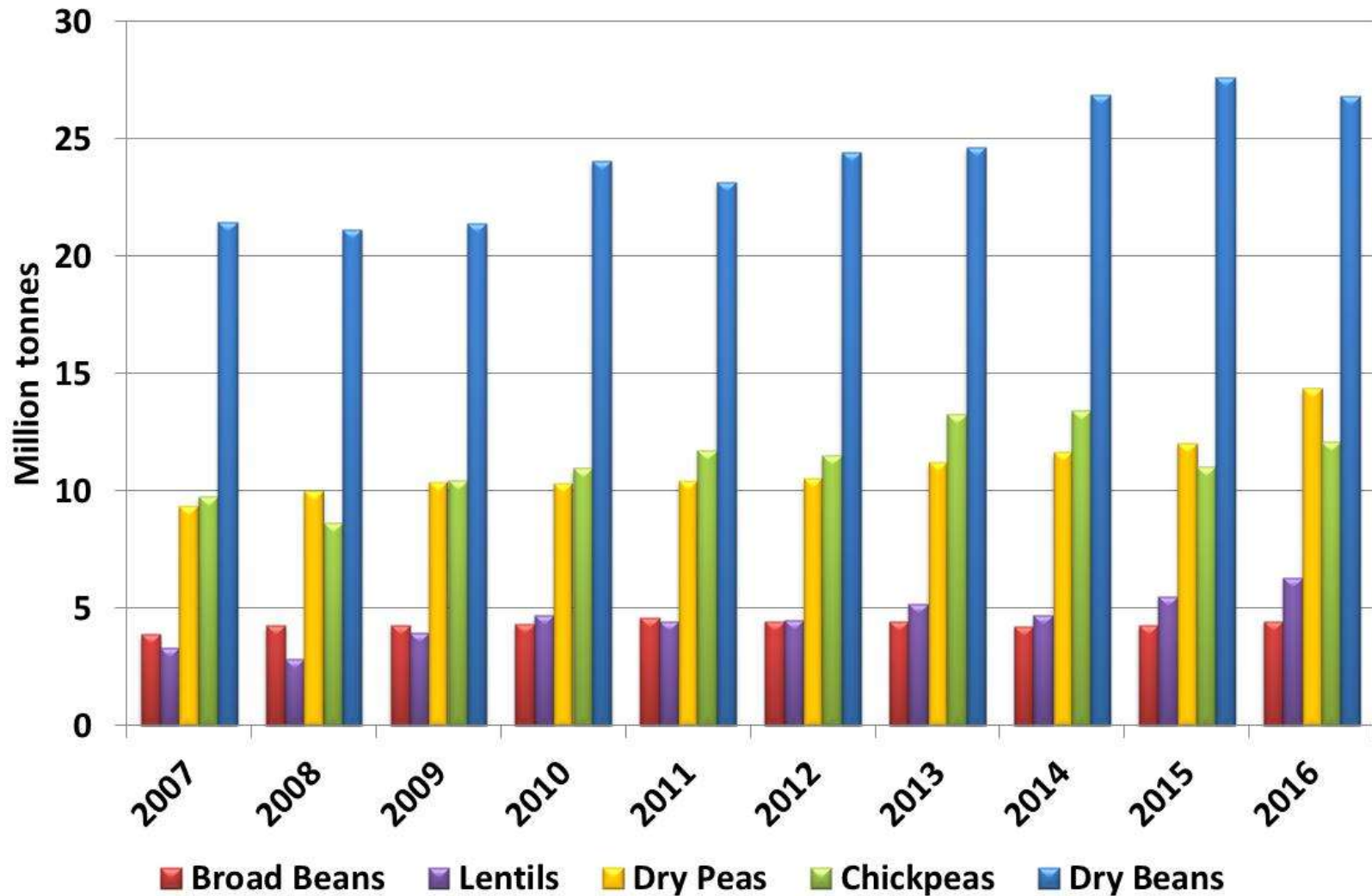


Dry Bean – In General

- Why Dry Bean?
 - By far the most important and traded of the pulse crops.
 - High value.
 - Diversifies marketing options.
 - As a legume a portion of it's nitrogen is supplied through biological N-fixation.
 - Ideal for breaking disease cycles
 - Provides yield boost to following crop.
 - Three types of bean growth habit:
 1. Type I – determinant bush-type
 2. Type II – indeterminate upright, short vine
 3. Type III- indeterminate sprawling vine

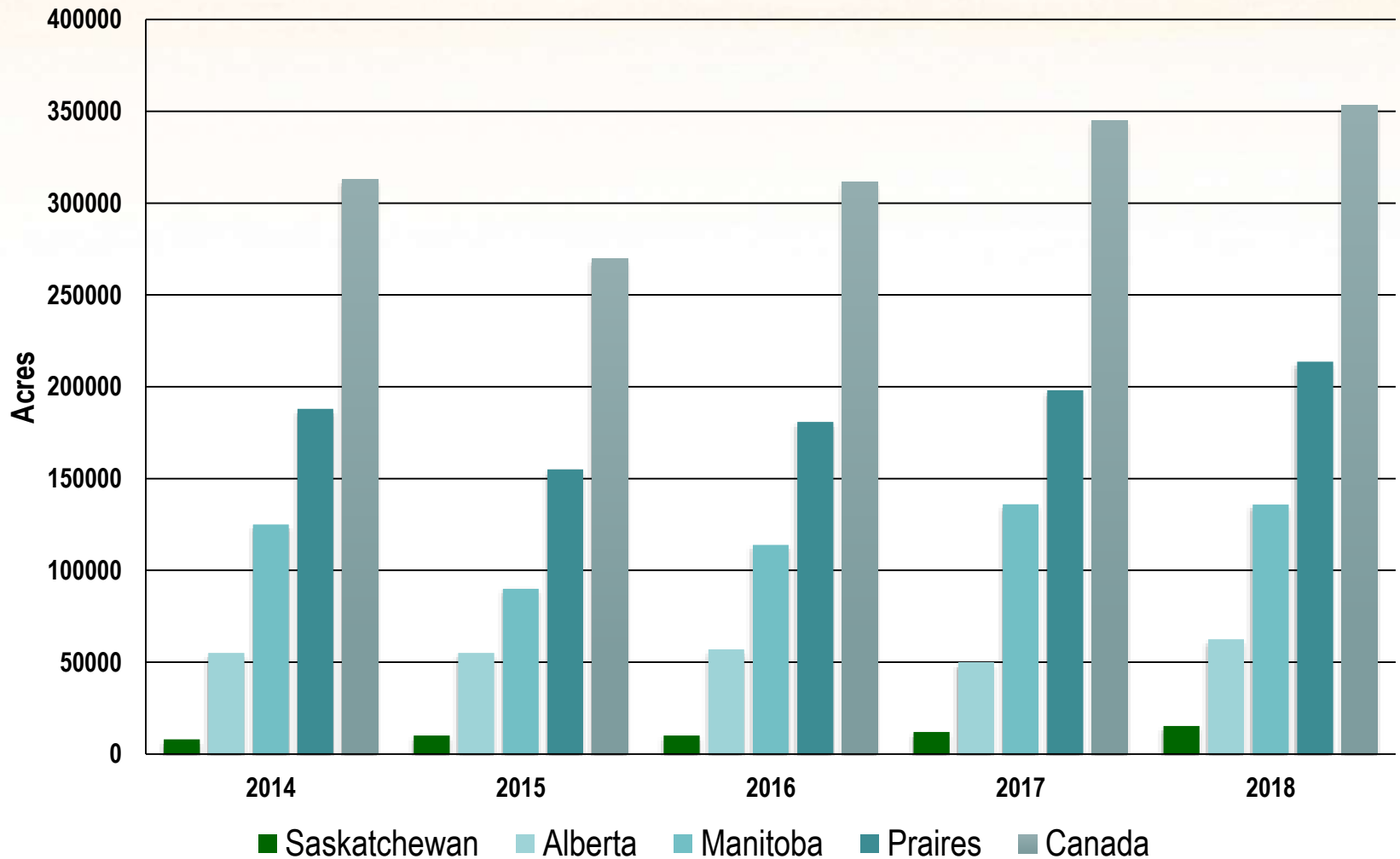
Dry Bean Production

Global Pulse Production



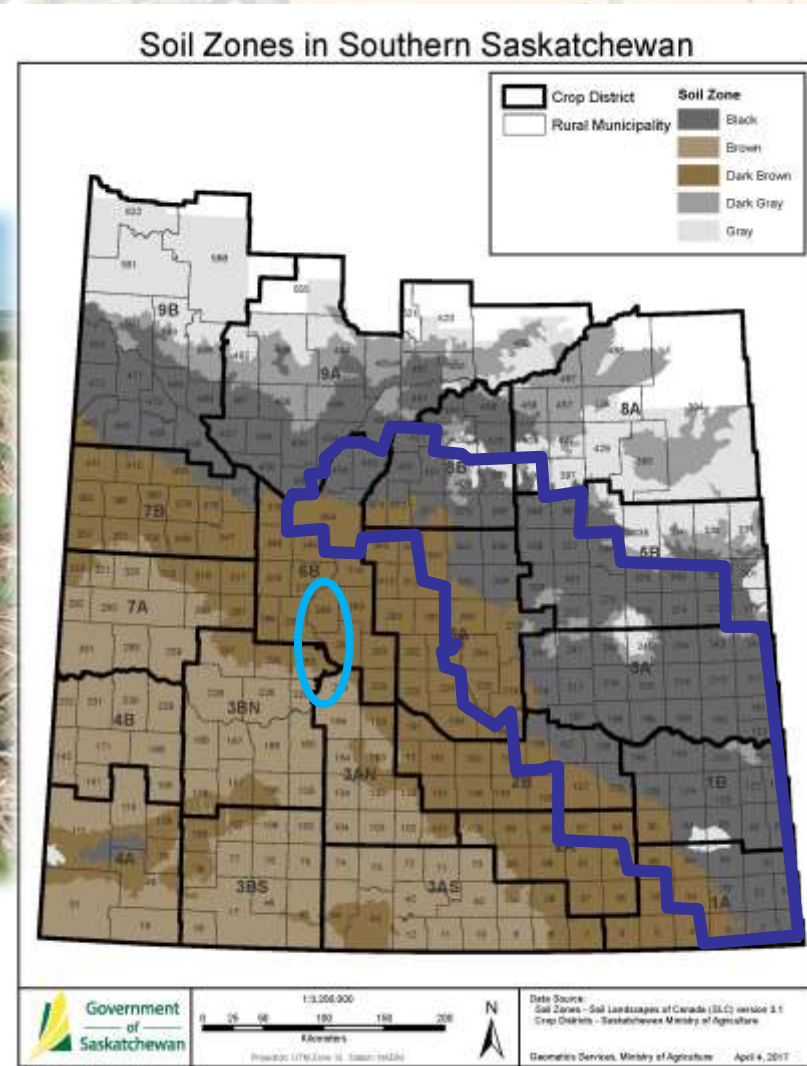
Canadian Dry Bean Production - Acres

Canadian Dry Bean Acres



Growing Region

SCIC Dryland Coverage Area
Irrigated Production Area



Present Saskatchewan Situation

- Present production primarily limited to irrigation within the Lake Diefenbaker Development Area (LDDA).
- Virtually 100% wide row production (22”).
- Approximately 90% of production custom row crop planted, undercut and combined.
- For an expansion of acreage the crop must be expanded to dryland production and be able to utilize existing on-farm equipment. (i.e. solid seeded production)



Dry Bean Narrow vs Wide Row Production 2016-18



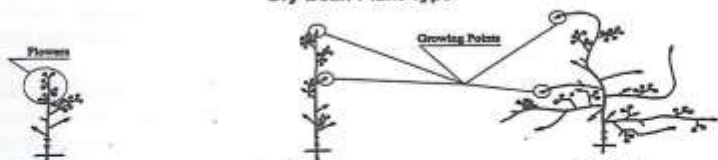
Dry Bean – Wide Row

Variety	Plant Type	Site Years	Yield as % of AC Island	Days to Maturity	Seed Weight (g/1000)	Pod Clearance (%)
Pinto						
AC Island	II	27	100	100	384	64
Medicine Hat	II	10	99	100	368	67
AAC Burdett	II	8	99	95	385	78
Othello	III	9	91	100	364	na
CDC WM-2	II	15	86	98	396	62
Winchester	II	25	85	97	361	73
AAC Explorer	II	7	79	99	375	65
CDC Pintium	I	4	72	95	401	na
Black						
AAC Black	II	10	91	99	276	74
Diamond II	II	27	88	99	279	78
AC Black Diamond	II	12	86	101	198	na
Black Violet	II	9	76	97	193	78
CDC Blackcomb	II	4	68	102	196	na
Great Northern						
AAC Tundra	II	16	88	98	373	68
AAC Whitehorse	II	11	87	97	393	70
AAC Whitestar	II	9	87	97	401	75
AC Resolute	II	26	76	97	360	72
Pink						
Viva	III	11	85	102	275	na
Small Red						
AC Redbond	II	15	87	95	333	64
Yellow						
AC Y015	I	7	57	101	407	66
AC Y012	I	7	56	101	397	65
CDC Sol	I	11	54	101	427	68

Average plot yield of AC Island (check): 4,196 kg/ha (3,743 lb/ac)

☹ PBR in effect or filed na – not assessed

Dry Bean Plant Type



Type I

Determinate bush

The main stem and branches end in flowers. Flowering lasts 10 to 20 days with fairly uniform pod maturity.

Type II

Indeterminate short vine

The main stem is erect. The stem and branches end in vegetative buds. Flowering lasts 10 to 30 days with uneven pod maturity.

Type III

Indeterminate sprawling vine

The stems are semi-prostrate with well developed branches and a dense canopy. Flowering is similar to Type II plants.

Graphic courtesy Colorado Dry Bean Production and IPM Bulletin 545A. Colorado State University Co-operative Extension and Agricultural Experimental Station, 1990.

Dry Bean – Narrow Row

The narrow row dry bean trials are sown on 20 cm (8 in.) row spacing to evaluate performance in a solid seeding management practice.

The pod clearance rating is a measure of the proportion of pods held 5 cm (2 in.) or more above ground level. This gives an indication of the suitability for harvest using a direct cut harvest system. Varieties with higher pod clearance ratings will normally have lower harvest losses.

The narrow row variety trials are a separate test from the wide row trials. These tests are not designed to compare conventional wide row and solid seeded management. **Narrow row yields and variety rankings cannot be compared to Wide Row yields and variety rankings in these tables.**

For other Market Type Varieties not listed here, please contact Garry Hnatowich (see contact page 1).

Variety	Plant Type	Site Years	Yield as % of AC Island	Pod Clearance Rating*	Days to Maturity
Pinto					
Medicine Hat	II	18	106	77	100
Winmor	II	10	103	70	100
AC Island	II	35	100	64	99
AAC Burdett	II	10	98	90	95
Winchester	II	35	95	79	97
CDC WM-2	II	26	88	74	98
Mariah	II	8	91	72	103
CDC Pintium	I	23	84	81	93
CDC Marmot	I	16	77	73	92
Black					
Carmen Black	II	7	103	81	104
AC Black Diamond	II	21	97	83	99
CDC Jet	II	18	97	82	102
AAC Black Diamond II	II	9	91	84	100
CDC Superjet	II	9	91	78	103
CDC Blackcomb	II	19	87	81	99
CDC Blackstrap	II	11	86	82	98
Great Northern					
AAC Tundra	II	15	91	74	98
AAC Whitestar	II	7	90	83	99
Resolute	II	20	85	76	98
AAC Whitehorse	II	9	84	79	98
AAC Explorer	II	5	79	67	100
Small Red					
AC Redbond	II	10	98	74	95
Navy					
Bolt	II	6	98	83	103
Lightning	II	8	83	82	102
Portage	II	8	80	81	102
Envoy	I	16	76	74	97
OAC Spark	I	9	75	79	100
Skyline	I	7	69	69	103
Yellow					
CDC Sol	I	15	72	73	101

Average plot yield of Winchester (check): 4,788 kg/ha (4,271 lb/ac)

*Pod clearance rating = % of pods that completely clear the cutter-bar at time of swathing.

☹ PBR in effect or filed

Dry Bean – Narrow vs Wide Row

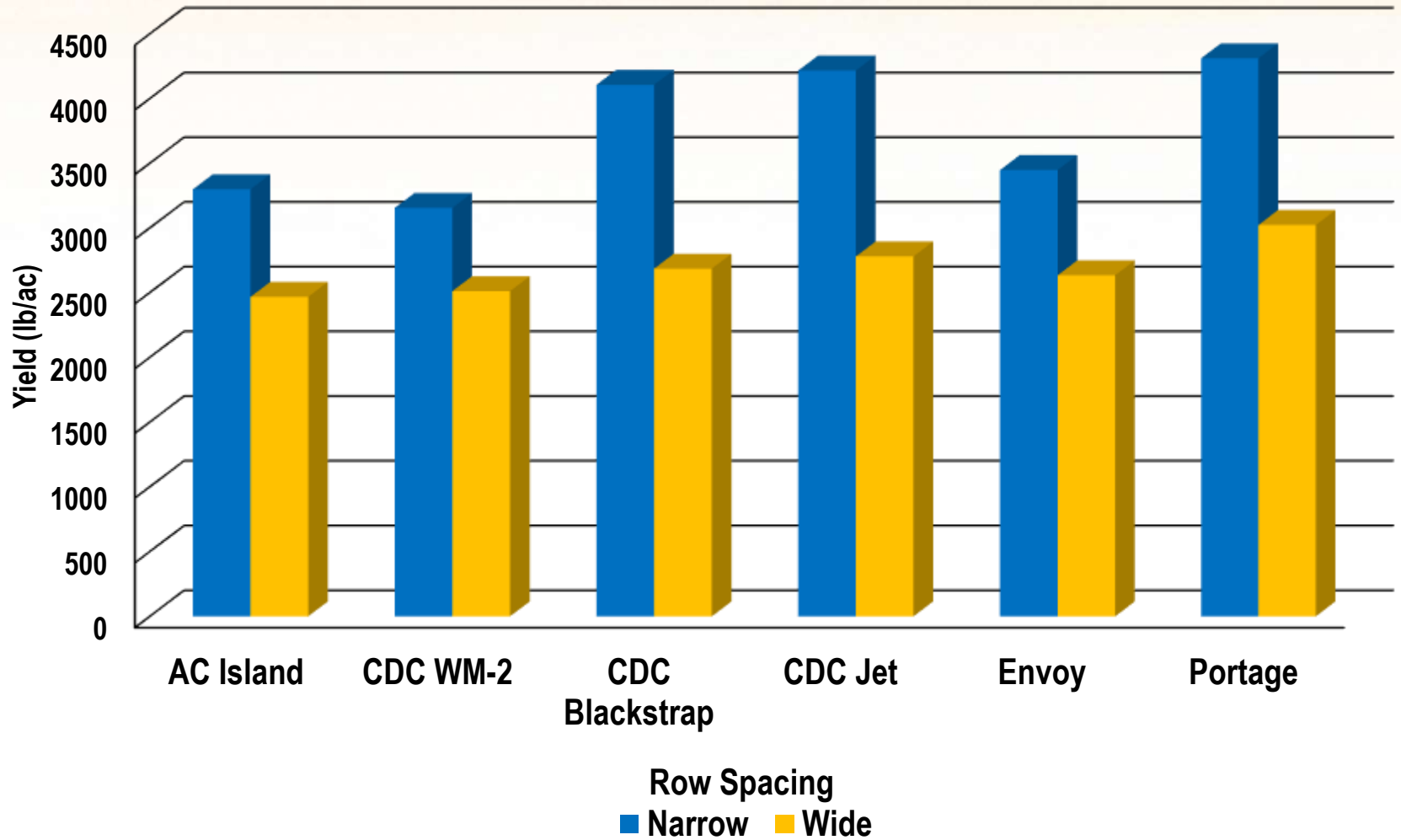
Trials conducted at Riverhurst (12 & 24")
& Outlook (8 & 24") annually

Class:	Variety #1	Variety #2
Pinto	AC Island	CDC WM-2
Black	CDC Blackstrap	CDC Jet
Navy	Envoy	Portage

Beans at Riverhurst were swathed and combined,
at Outlook they were undercut and combined

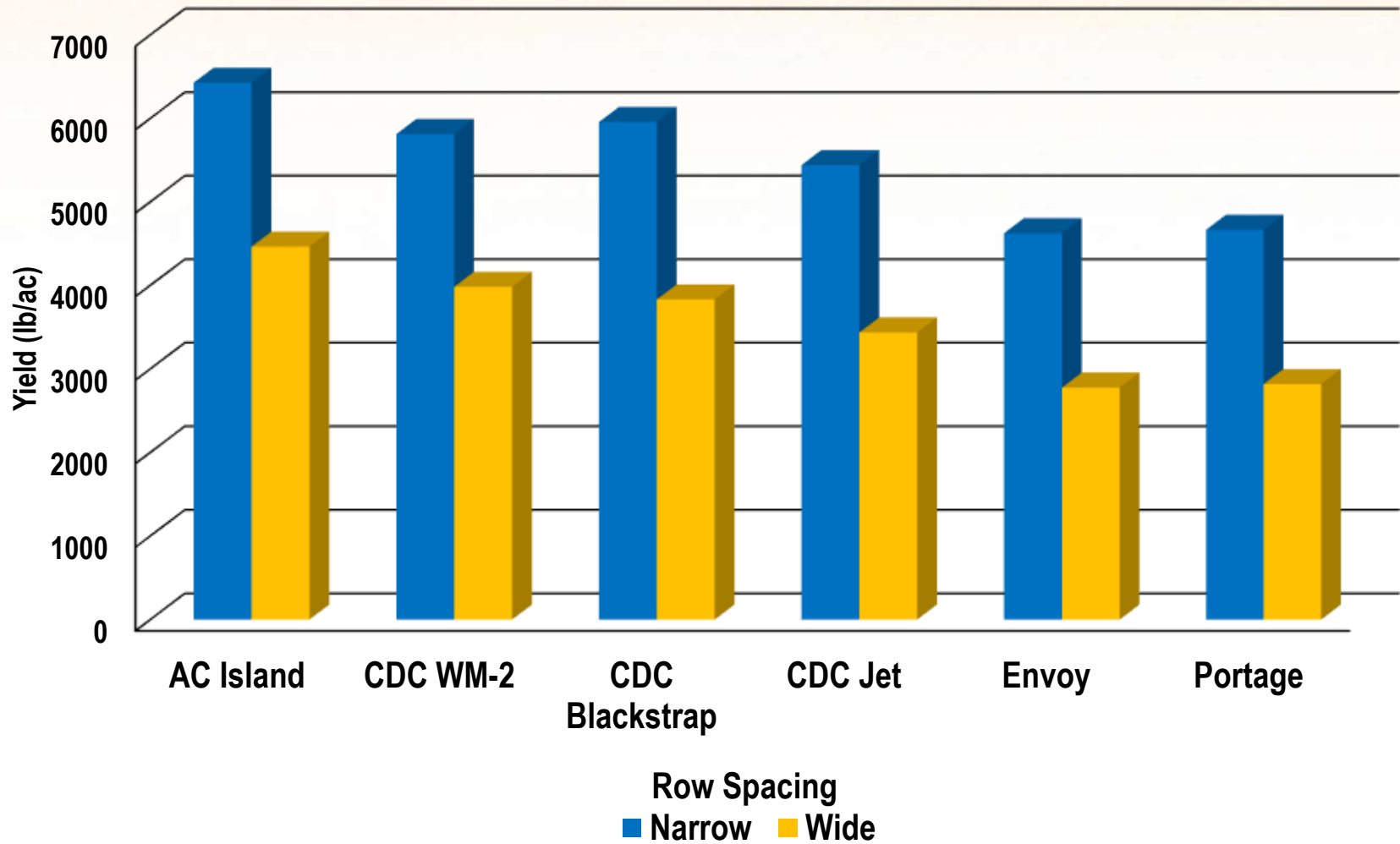
Dry Bean – Narrow vs Wide Row

Yield (lb/ac) Combined Locations 2016



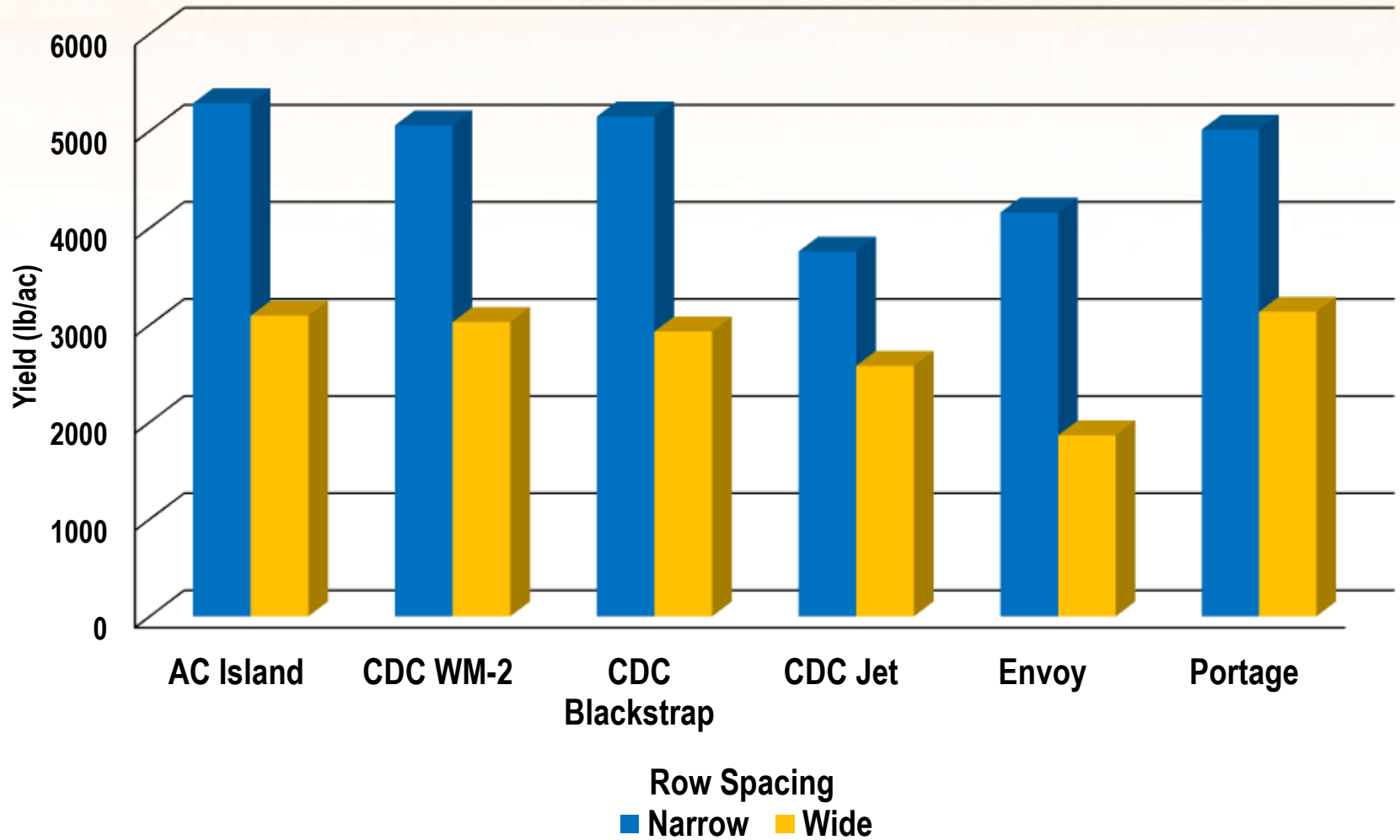
Dry Bean – Narrow vs Wide Row

Yield (lb/ac) Combined Locations 2017



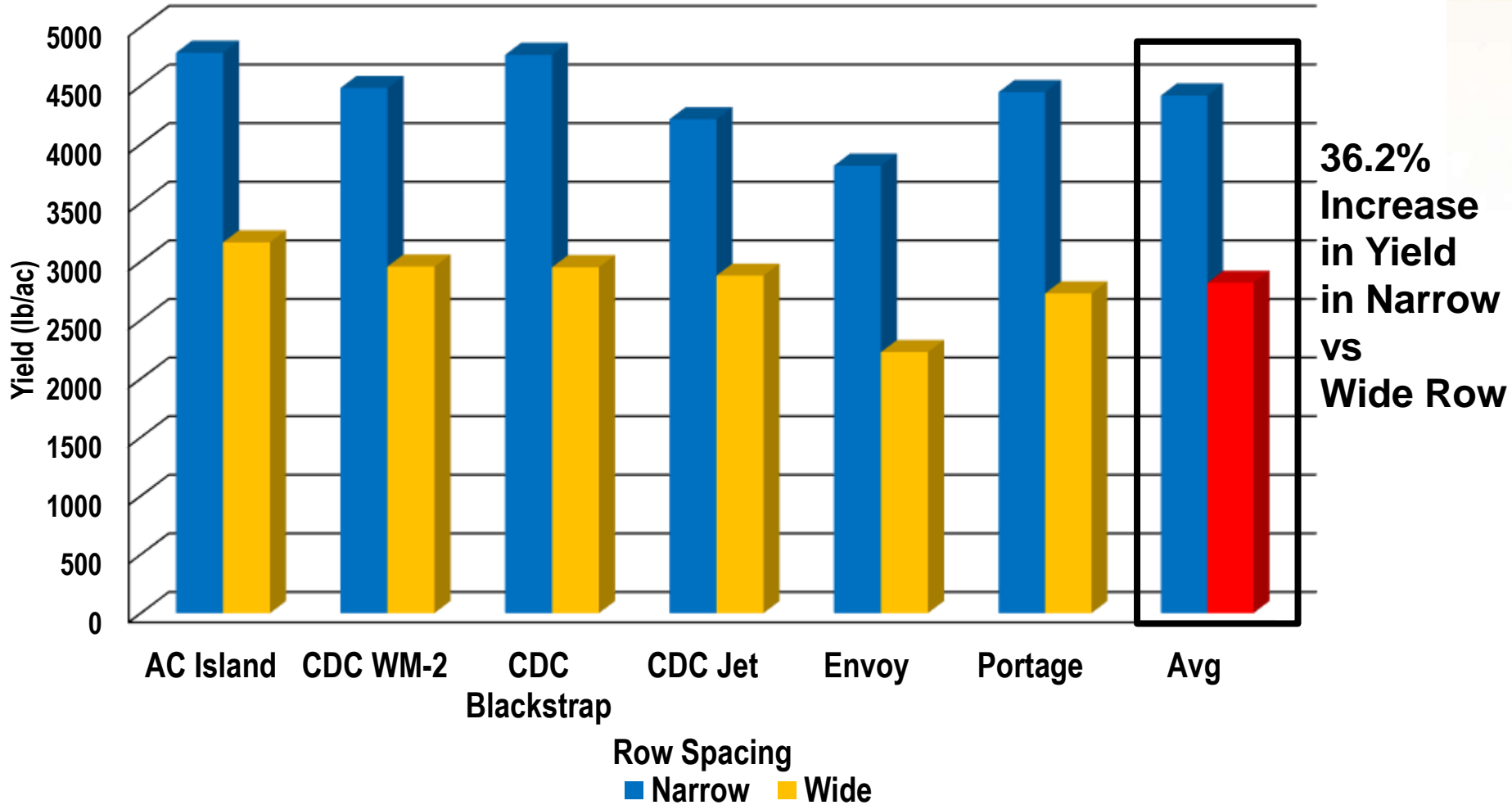
Dry Bean – Narrow vs Wide Row

Yield (lb/ac) Combined Locations 2018



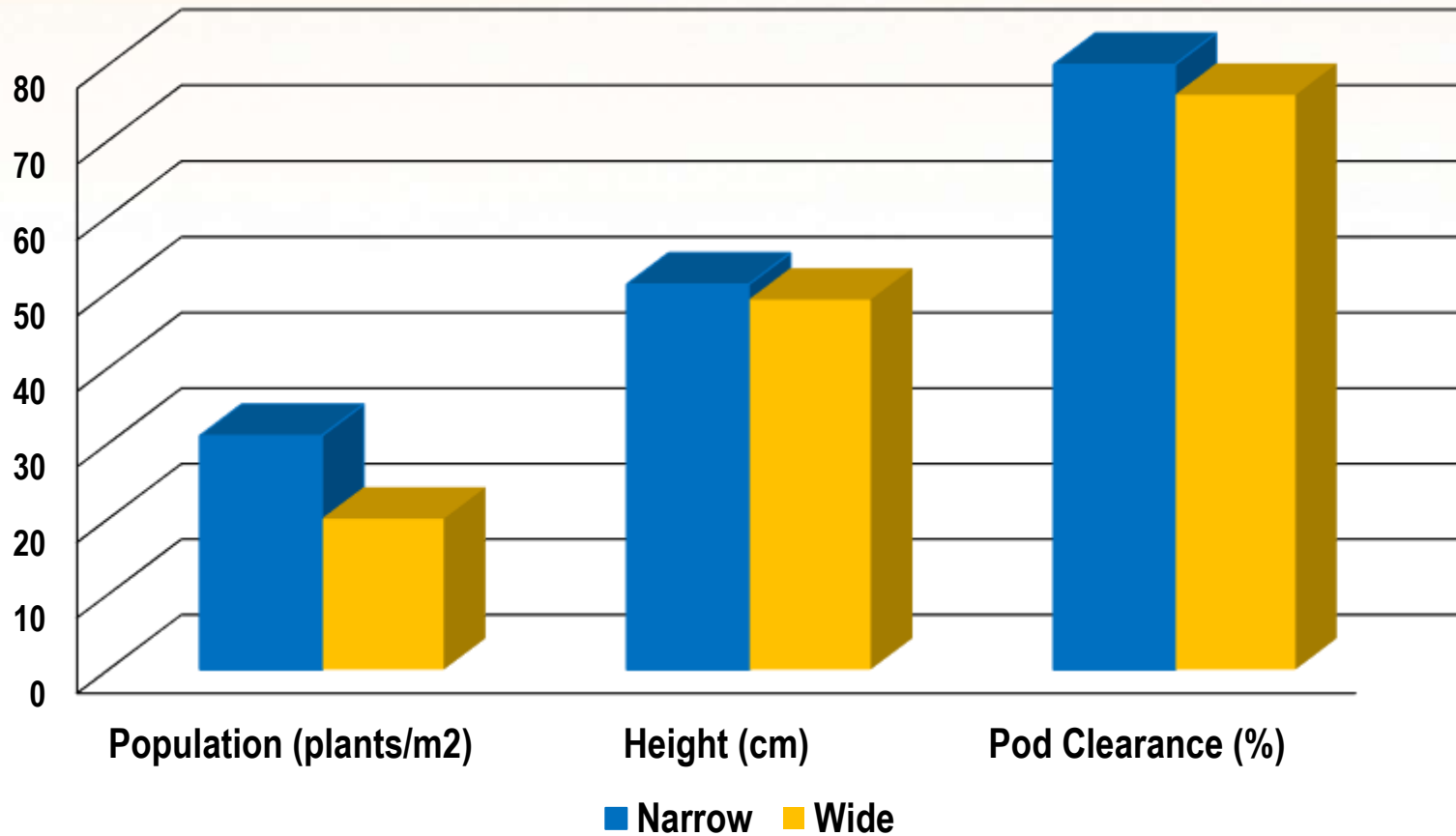
Dry Bean – Narrow vs Wide Row

Yield (lb/ac) 6 Site-Year Summary 2016-18



Agronomic Influence of Row Spacing at Outlook 2016-2018

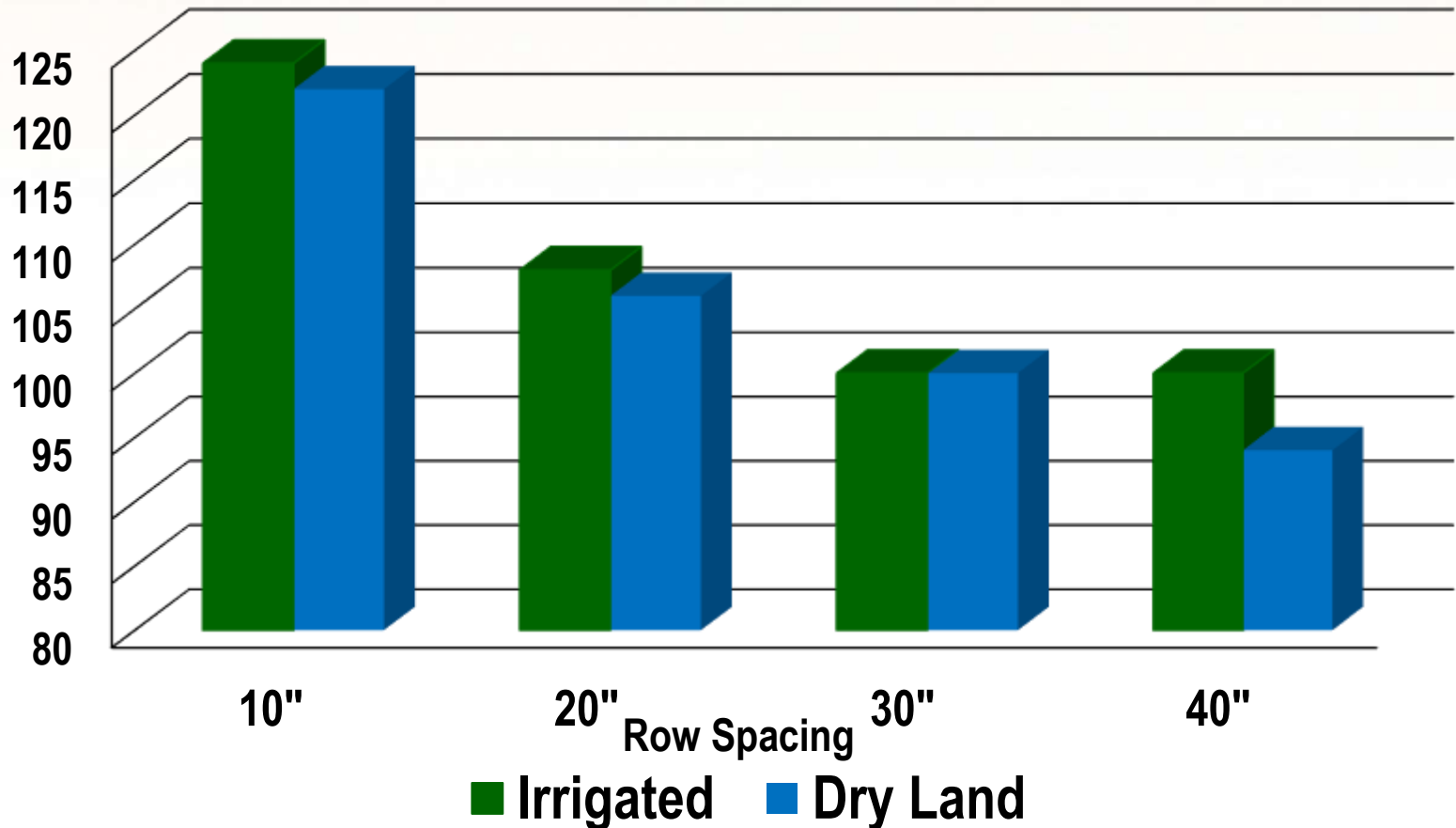
3 Site-Year Summary 2016-2018



Pinto bean yield by row spacing

% Yield of 30" Row

(4 Station Year Irrigated, 5 Station Year Dryland)



Dry Bean Production



\$ Economic's \$



Irrigation Crop Diversification Corp Irrigation Economics and Agron

Crop	Target Yield	Price \$/bu	Net Return \$/ac
Pea	75 bu/ac	\$6.53/bu	-\$10
Red Lentil	2400 lb/ac	\$0.16/lb	-\$73
Faba Bean	3600 lb/ac	\$0.132/lb	-\$82
Soybean	40 bu/ac	\$10.66/bu	-\$29
Dry Bean - Pinto	3000 lb/ac	\$0.32/lb	\$291
Dry Bean - Black	3000 lb/ac	\$0.32/lb	\$352

Dry Bean

ECONOMICS

ITEM	#	UNIT	\$/ac	My Farm \$/ac
Seed			\$112.50	
Seed treatment / inoculant			\$0.00	
Soil test			\$1.00	
Fertilizer: * N	60	lb	\$34.74	
	P ₂ O ₅	40	lb	\$24.40
	K ₂ O	0	lb	\$0.00
Herbicide			\$59.53	
Insecticide			\$0.00	
Fungicide			\$60.48	

AGRONOMICS

Variety Selection

Choose an indeterminate short vine-type plant for irrigated production. Refer to the ICDC **2019 Crop Varieties for Irrigation** publication for information on variety performance. Physical copies can be obtained at CSIDC or at the Ministry of Agriculture office in Outlook. It is also available on ICDC's website.

Seeding

Plant population	96000.0	plants/ac
TKW	345.0	grams
Seeding Rate	75.0	lb/ac

Row crop equipment is required.

Seed after the danger of frost: May 20-25th.

et class and seed lot.
it. Apply 50-60 lb/ac N and
respond to the micronutrient
recommendations for fertilizer
levels and crop needs.
250-350 mm; avg. 300 mm ☼
/day
/day
mm/day
irrigations to minimize disease
moisture status.†
uckskin in colour and leaves
16% moisture to avoid seed
conveyors and bean ladders.
8.0%
Group 2, 4, 6, 27 herbicides.
incidence with crop rotation to

Gross	\$864	\$960
Net Return	\$195	\$291
Specialized equipment (\$/ac/yr)	Custom	Own
Planter	\$19.00	\$5.04
Row Crop Cultivator	\$24.00	\$2.11
Undercutter	\$20.00	\$3.35
Dry Bean Combine		\$27.90
10" Belt Conveyor		\$2.53
Combine	\$34.00	
TOTAL	\$97.00	\$40.93

non host crops like cereals and flax, choosing a less susceptible upright variety like AC Island, and treat at the appropriate stage with a fungicide. Bacterial blight may require control with a copper-based foliar product.

* May require 5 lb/ac of zinc

† Refer to the Saskatchewan Ministry of Agriculture irrigation Scheduling Manual

☼ 10 year average crop water use determined from seasonal evapotranspiration from Outlook, Saskatchewan

More Information

Call an Irrigation Agriologist at (306) 867-5500 or check our website: www.irrigationsaskatchewan.com. Use the pulse production manuals from The Saskatchewan Pulse Growers Association.



To research and provide lead
in irrigation production

Dry Bean Production

Moving from Wide Row to Narrow Row & from Irrigation to Dryland



On-Farm Narrow Row Production - Irrigated



Results: Jeff Ewen, Riverhurst 2017

	Expenses (\$/ac)	Yield (lb/ac)	Gross Return (\$)	Net Return(\$)
Narrow Row- Dryland	\$257.32	1428.3	\$471.35	\$214.03
Narrow Row - Straight Cut	\$366.63	3226.0	\$1,064.58	\$697.95
Narrow Row - Swathed	\$368.79	3515.5	\$1,160.10	\$791.31
Wide Row - Custom	\$439.55	3735.3	\$1,232.63	\$793.08

Return based on
\$0.33/lb

Evaluations assisted by ICDC, PAMI and funding by SPG

On-Farm Narrow Row Production -Dryland



Sherrilyn Phelps – Aug.17/2018

**Nipawin SK 2018 – Clean Yield 2000 lb/ac
Desicated & Direct Harvested with a
Macdon Flex Header**

On-Farm Narrow Row Production - Dryland



Sherrilyn Phelps – Aug.17/2018

**North Battleford SK 2018 – Clean Yield 1500 lb/ac
Desiccated & Direct Harvested**

Dry Bean – Narrow vs Wide Row

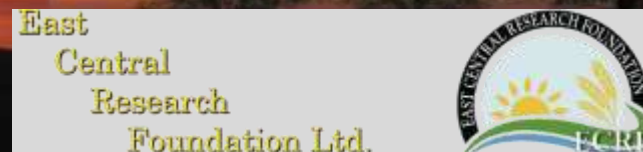
General Observations:

- **Narrow, solid-seeded dry bean production is feasible in SK.**
- **Agronomy works with narrow row production, difficulties are a matter of engineering not agronomy!**
- **Current air seeder delivery systems damage seed**
- **Tillage to facilitate undercutting only – no major outside benefits**
- **Plant population seems to have a strong effect on days to maturity???**
- **Swathing can reduce harvest losses, but a very delicate and challenging task**
- **Straight harvest challenging but can result in small losses at the header, > the material the < the losses**
- **Bean combine much gentler on seed and cleaner sample**
- **Straight harvest system has much better residue management and reduced soil erosion potential**
- **Both systems resulted in seed moisture of 12%**

Funding Provided by ADOPT



Thank You



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