Supply-Demand Balances for Grain

The Relationship of Grain Stocks-to-Use & Prices

KSU Ag Economics 520 – Brian Coffey Instructor

October 15, 2020

GUY ALLEN & DANIEL O'BRIEN, AGRICULTURAL ECONOMISTS

Kansas State University Department of Agricultural Economics

IGP Institute

Grain Supply-Demand Balances & "Ending Stocks-to-Use" vs "Prices"

2

1) **Why** the USDA represents grain supply-demand in quantifiable *"balance sheets"*

2) ***"Ending Stocks"*** measure of the relative scarcity of grain supplies & are a key price determinant

3) **"Ending Stocks-to-Use"** vs **"Prices"** is a key market measure
   - Strengths & Weaknesses of **% Stocks/Use** measures, & how *"ceteris paribus"* (all else being equal) may be a ***STRONG*** assumption

Why the USDA represents grain supply-demand in quantifiable *"balance sheets"*

3

- USDA S-D balance sheets represent the relative quantities of **grain supplies versus usage**
  - As expected grain supply & usage changes over time, S-D balance sheets provide an "economic structure" for assessing their impact on grain markets
  - **USDA information** on Crop & Livestock Production, Quarterly Grain Stocks, Grain Imports & Exports, Bioenergy Production, Soybean Crush, etc., <u>all can be represented in the categories in grain supply-demand balance sheets</u>

"Ending Stocks" measure the *<u>relative scarcity</u>* of grain supplies & are a key price determinant

4

- The situation of having ***"More"*** versus ***"Less"*** **<u>Ending Stocks</u>** of grain typically has ***an inverse effect*** on grain prices
  - When supplies are "**abundant"** (i.e., ***<u>larger</u>*** ending stocks), THEN buyers have ***<u>less</u>*** **urgency** in coming to the market & bidding for grain
    - ⇨ *"Larger supply – lower prices"*
  - When supplies are "**scarce"** (i.e., ***<u>smaller</u>*** ending stocks), THEN buyers have ***<u>more</u>*** **urgency** in coming to the market & bidding for grain
    - ⇨ *"Smaller supply – higher prices"*

"Ending Stocks-to-Use" vs *"Price"* is a Key Measure in Grain Markets

- The relative quantify of Ending Stocks to Total Usage is designated as ***"Ending Stocks-to-Use"***
  - ***"Ending Stocks-to-Use"*** is a measure of the relative scarcity of grain supplies to left over to the amount of grain used in a marketing year
  - As a measure of "***relative scarcity of ending supplies"*** economic theory indicates that % Stocks/Use is inversely related to prices

⇧ % Stocks/Use → ⇩ Price

⇩ % Stocks/Use → ⇧ Price

Current Grain Market Examples of **% Stocks/Use** vs **Prices** for U.S. Grains via USDA

Grain Market Supply-Demand Balances

Crop	Production	Ending Stocks	% Stocks/Use	U.S. Farm Price
Corn	14.722 bb ⇧8%	2.167 bb ⇧9%	14.9% Vs 14.4% yr ago	$3.60 /bu Vs $3.56 yr ago
Soybeans	4.268 bb ⇧20%	290 mb ⇩45%	6.4% Vs 13.2% yr ago	$9.80 /bu Vs $8.57 yr ago
All Wheat	1.826 bb ⇩5%	883 mb ⇩14%	42.1% Vs 49.2% yr ago	$4.70 /bu Vs $4.58 yr ago
HRW Wheat	659 mb ⇩22%	334 mb ⇩33%	40.0% Vs 59.0% yr ago	

Grain Market Supply-Demand Balances

Crop	Production	Ending Stocks	% Stocks/Use	U.S. Farm Price
Grain Sorghum	371 mb ⇧9%	30 mb ⇧3%	8.1% Vs 7.7% yr ago	$3.60 /bu Vs $3.34 yr ago
Cotton	17.05 m-bales ⇩14%	7.2 m-bales ⇩0.7%	42.1% Vs 41.0% yr ago	$0.61 c/lb Vs $0.596 yr ago

Corn & Sorghum Markets

9

Kansas State University Department of Agricultural Economics

U.S. Corn & Sorghum Stocks…..

10

- **Corn: "*Large*" Stocks & % S/U** @ $3.60 /bu^U.S. Farm$
  - o **End Stocks 2020/21** ⇨ 2.167 bln bu (*vs **1.995 bb** last year*)
  - o **% Stocks/Use 2020/21** ⇨ 14.9% S/U (*vs **14.4%** S/U last year*)

- **Grain Sorghum: "*Strong*" Exports** @ $3.60 /bu^U.S. Farm$
  - o **End Stocks 2020/21** ⇨ 30 mln bu (*⇧ Exports & ⇩ Ethanol Use*)
  - o **% Stocks/Use 2020/21** ⇨ 8.1% S/U (*⇧ vs **7.7%** S/U last year*)

Kansas State University Department of Agricultural Economics

U.S. Corn Supply and Demand

Item	2019/2020 estimate	2020/2021 forecast	Change from September 11	Change from 2019/2020
Planted area (million acres)	89.7	91.0	-1.0	1.2
Harvested area (million acres)	81.3	82.5	-0.9	1.2
Yield (bushels per acre)	167.5	178.4	-0.1	10.9
		------------ *Million bushels* ------------		
Beginning stocks	2,221	1,995	-258	-226
Production	13,620	14,722	-178	1,102
Imports	42	25	--	-17
Total supply	15,883	16,742	-436	859
Feed and residual	5,827	5,775	-50	-52
Food, seed, and industrial	6,282	6,475	-50	193
Ethanol	4,852	5,050	-50	198
Domestic use	12,109	12,250	-100	141
Exports	1,778	2,325	--	547
Total use	13,887	14,575	-100	688
Ending stocks	1,995	2,167	-336	172
		----------------- *Percent* -----------------		
Stocks to use ratio	14.4	14.9	-2.2	0.5
		------------ *Dollars per bushel* ------------		
Average market price	3.56	3.60	0.10	0.04

-- No change.

October 9, 2020

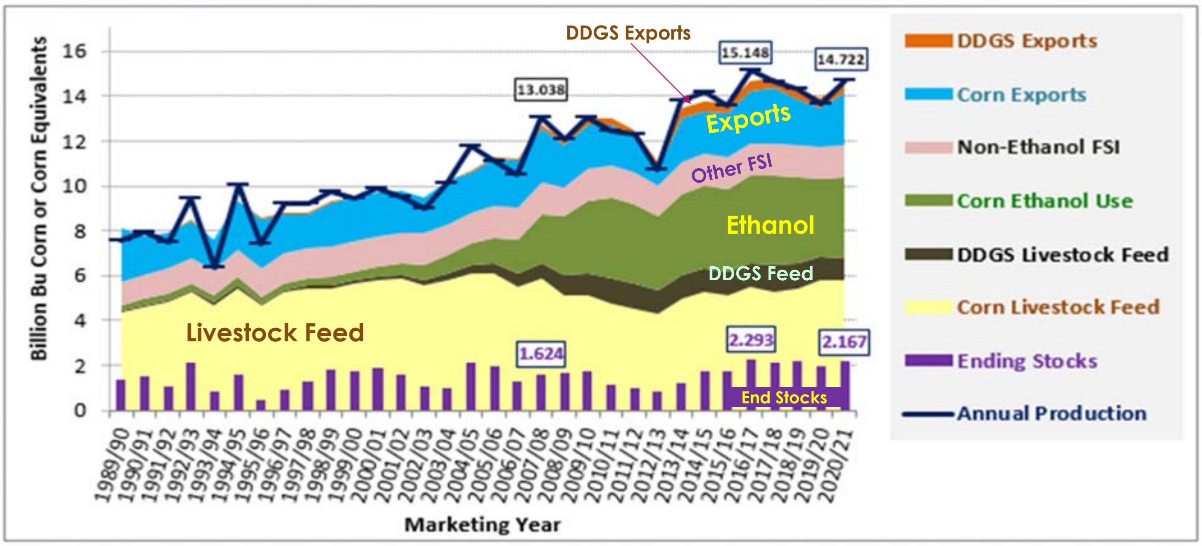
U.S. Corn Production & Supplies

Final 2020 ?

U.S. Corn Production

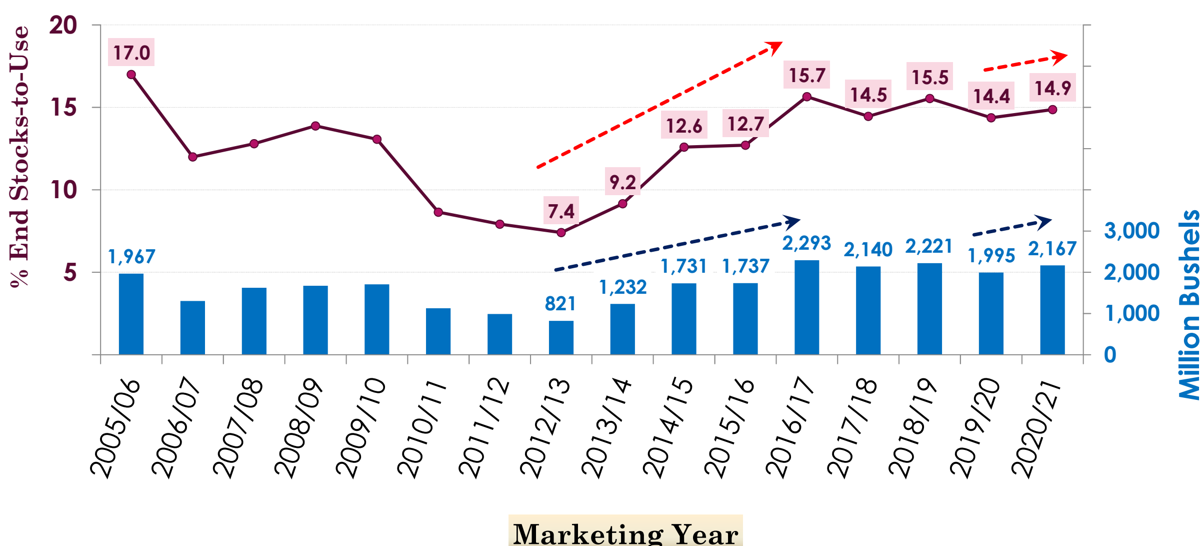
U.S. Corn Use – By Category

13



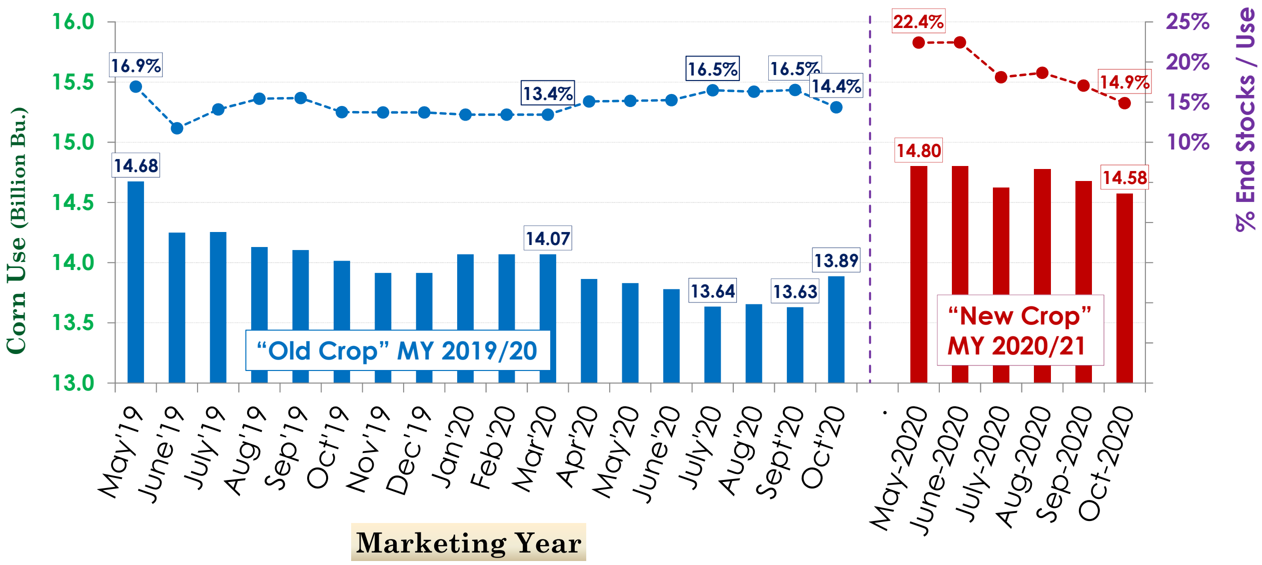
U.S. Corn Ending Stocks & % Stx/Use

14



U.S. Corn Total Use Projections (USDA)

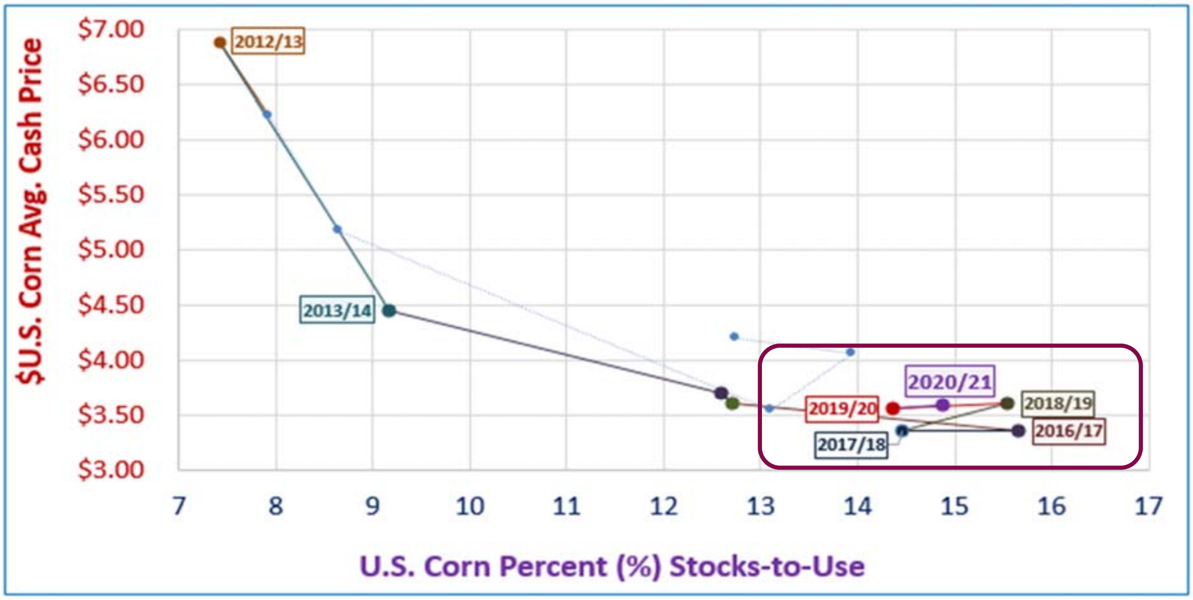
For "Old Crop" MY 2019/20 & "New Crop" MY 2020/21



U.S. Corn % Stocks/Use vs Price$

U.S. Corn % Stocks/Use vs Price$

17



World Corn Production

18

Country or Region	2019/2020 estimate	2020/2021 forecast	Change from September 11	Change from 2019/2020
		Million Tons		
World	1,116.3	1,158.8	-3.6	42.5
United States	346.0	373.9	-4.5	28.0
Foreign	770.4	784.9	1.0	14.5
Argentina	51.0	50.0	--	-1.0
Brazil	102.0	110.0	--	8.0
Mexico	26.5	28.0	--	1.5
Canada	13.4	14.0	--	0.6
European Union	66.7	66.1	-0.2	-0.6
Serbia	7.7	8.0	0.8	0.3
FSU-12	55.8	57.0	-2.0	1.3
Ukraine	35.9	36.5	-2.0	0.6
Russia	14.3	15.0	--	0.7
South Africa	16.3	14.0	--	-2.3
China	260.8	260.0	--	-0.8
India	28.6	28.0	--	-0.6

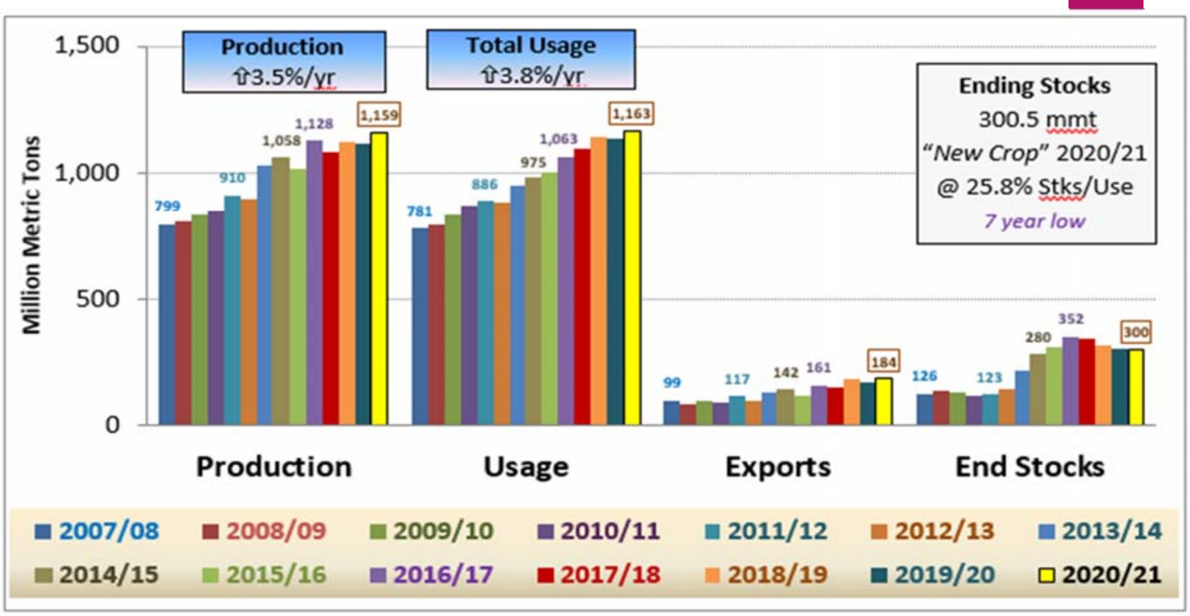
-- No change.

October 9, 2020

World Corn Supply and Use

Item	2019/2020 estimate	2020/2021 forecast	Change from September 11	Change from 2019/2020
	---------------- Million Tons ----------------			
Beginning stocks	319.8	304.2	-4.9	-15.6
Production	1,116.3	1,158.8	-3.6	42.5
Total Supply	1,436.2	1,463.1	-8.5	26.9
Feed use	714.2	731.3	-1.8	17.1
Total use	1,131.9	1,162.6	-2.1	30.7
Trade	170.6	184.5	-1.6	13.9
Ending Stocks	304.2	300.5	-6.3	-3.8

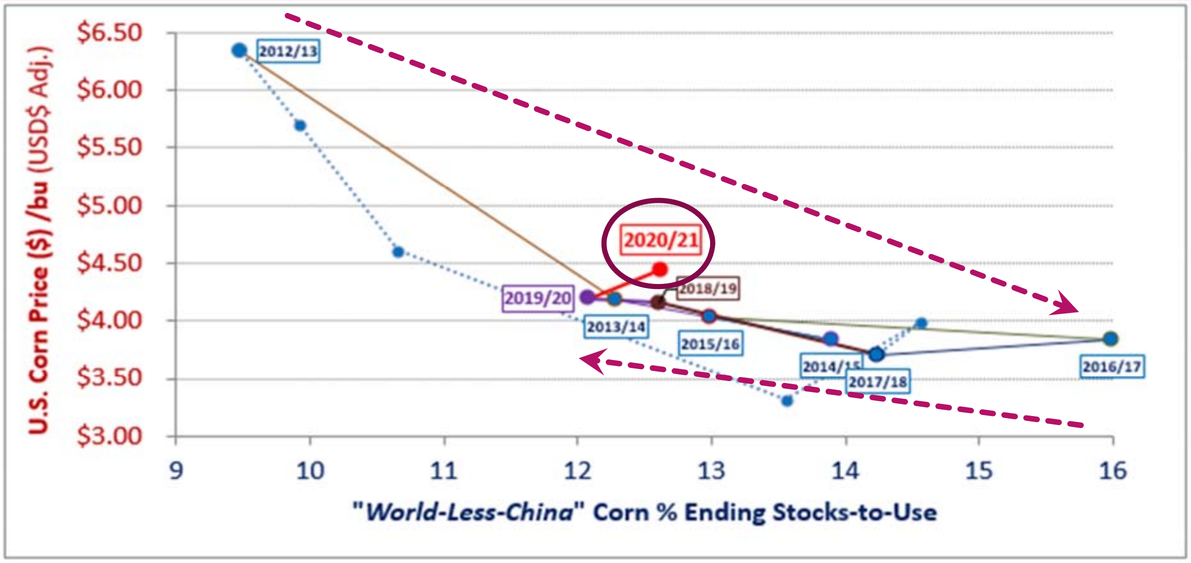
World Corn Supply, Use & Stocks



21

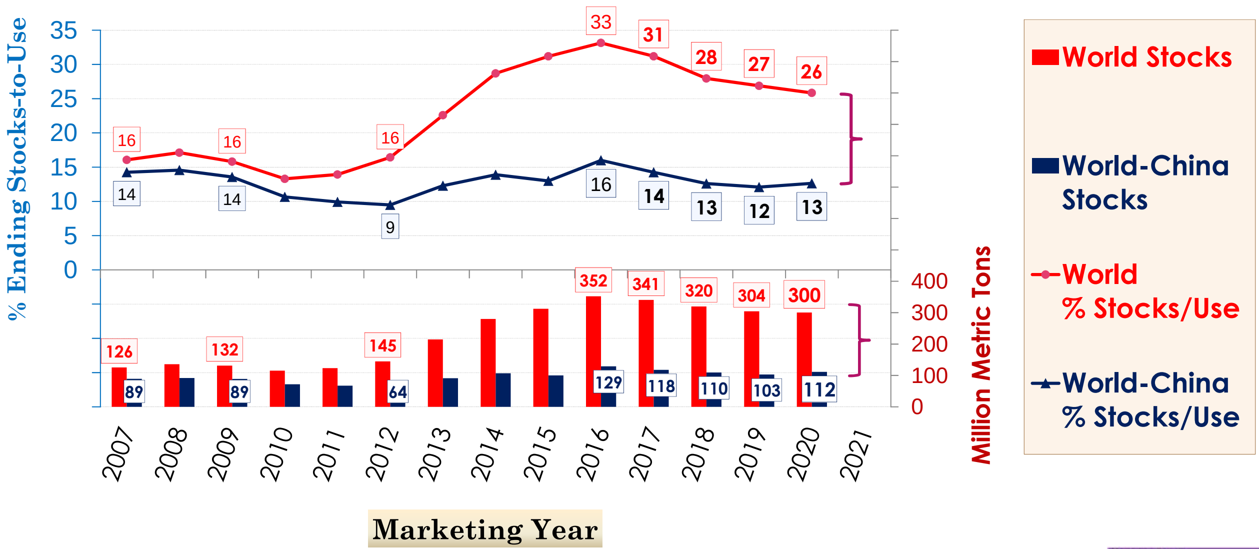
U.S. Corn $USD-adj vs World Less China %Stx/Use

MY 2007/08 through “New Crop” MY 2020/21



18

World & *World-less-China* CORN Stocks & %S/U



Wheat Markets

23

KANSAS STATE UNIVERSITY | Department of Agricultural Economics

U.S. Wheat Stocks…..

24

- **All U.S. Wheat**: "*Large but Declining*" **Stocks**
  - **End Stocks 2020/21** ⇨ 883 mln bu *(1.028 bb last year)*
  - **% Stocks/Use 2020/21** ⇨ 42.3% S/U *(49.2% Stx/Use last year)*

- **U.S. HRW Wheat**: "*Large but trending Lower*" **Carryover**
  - **End Stocks 2020/21** ⇨ 334 mln bu *(506 mb last year)*
  - **% Stocks/Use 2020/21** ⇨ 40.0% S/U *(59.0% Stx/Use last year)*

KANSAS STATE UNIVERSITY | Department of Agricultural Economics

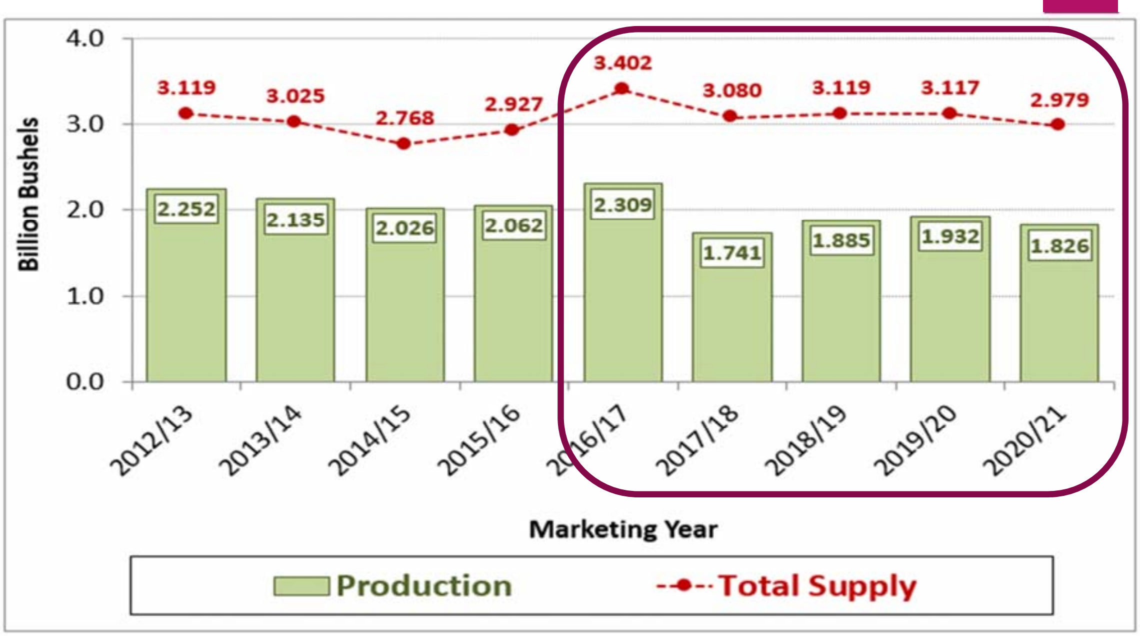
U.S. Wheat Supply and Demand

Item	2019/2020 estimate	2020/2021 forecast	Change from September 11	Change from 2019/2020
Planted area (million acres)	45.5	44.3	0.1	-1.1
Harvested area (million acres)	37.4	36.7	0.1	-0.6
Yield (bushels per acre)	51.7	49.7	-0.4	-2.0
	------------ *Million bushels* ------------			
Beginning stocks	1,080	1,028	-16	-52
Production	1,932	1,826	-12	-106
Imports	105	125	-5	20
Total supply	3,117	2,979	-33	-138
Food use	962	960	--	-2
Seed	60	61	--	1
Feed and residual	102	100	10	-2
Domestic use	1,123	1,121	10	-2
Exports	965	975	--	10
Total use	2,089	2,096	10	7
Ending stocks	1,028	883	-43	-145
	------------------ *Percent* ------------------			
Stocks to use ratio	49.2	42.1	-2.2	-7.1
	------------ *Dollars per bushel* ------------			
Average market price	4.58	4.70	0.20	0.12

-- No change.

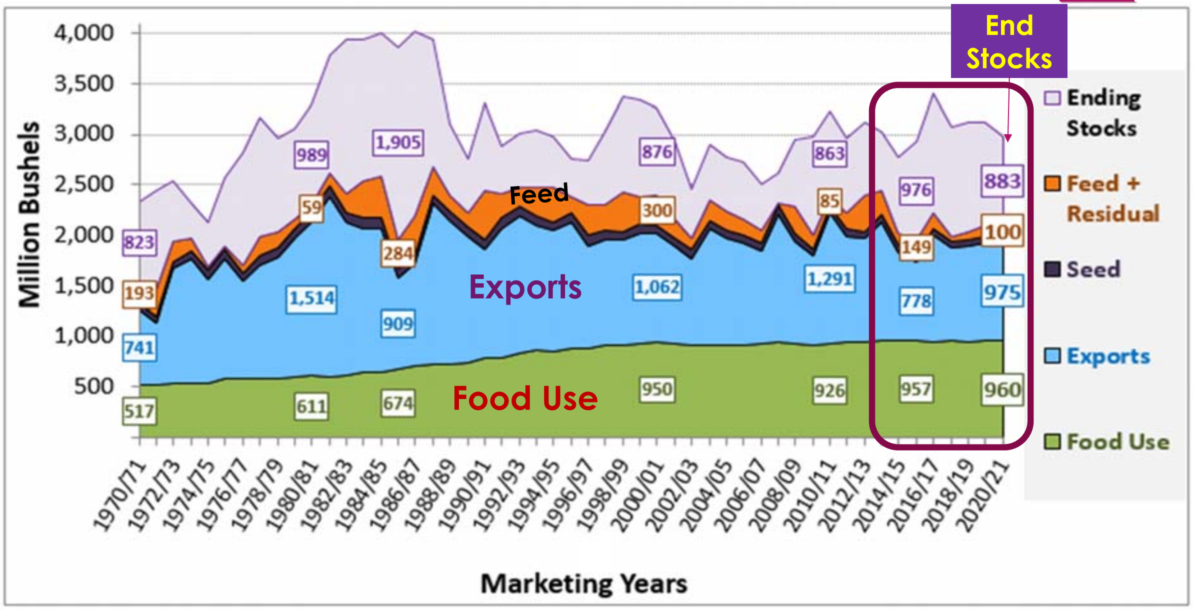
October 9, 2020

U.S. Wheat Production & Supplies



U.S. Wheat Use – By Category

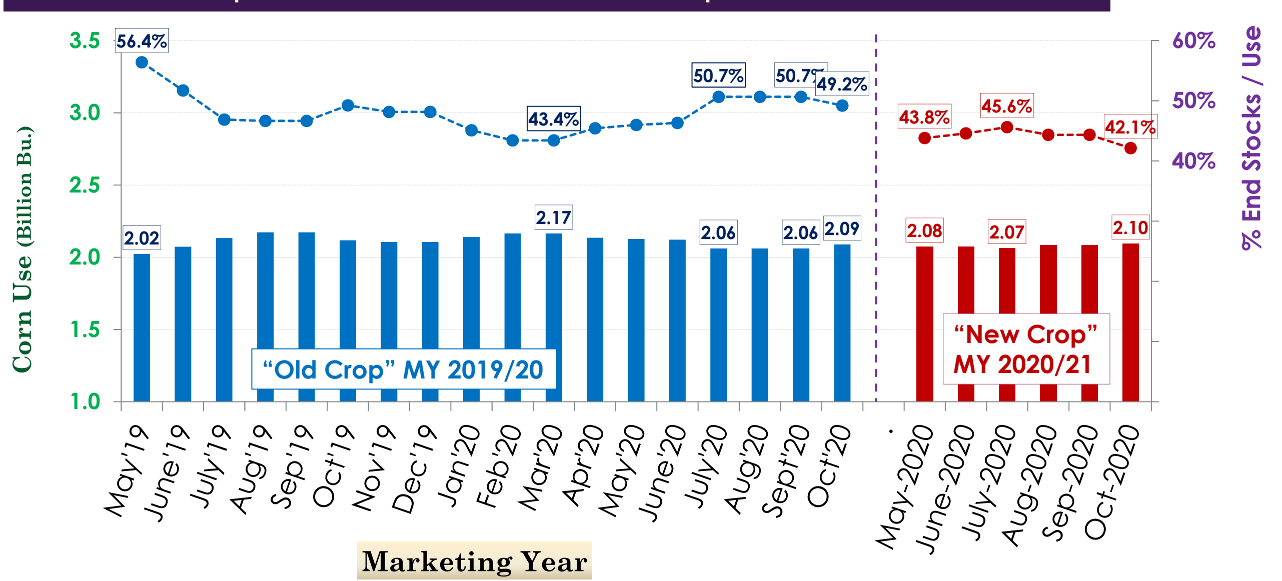
27



U.S. Wheat Total Use Projections (USDA)

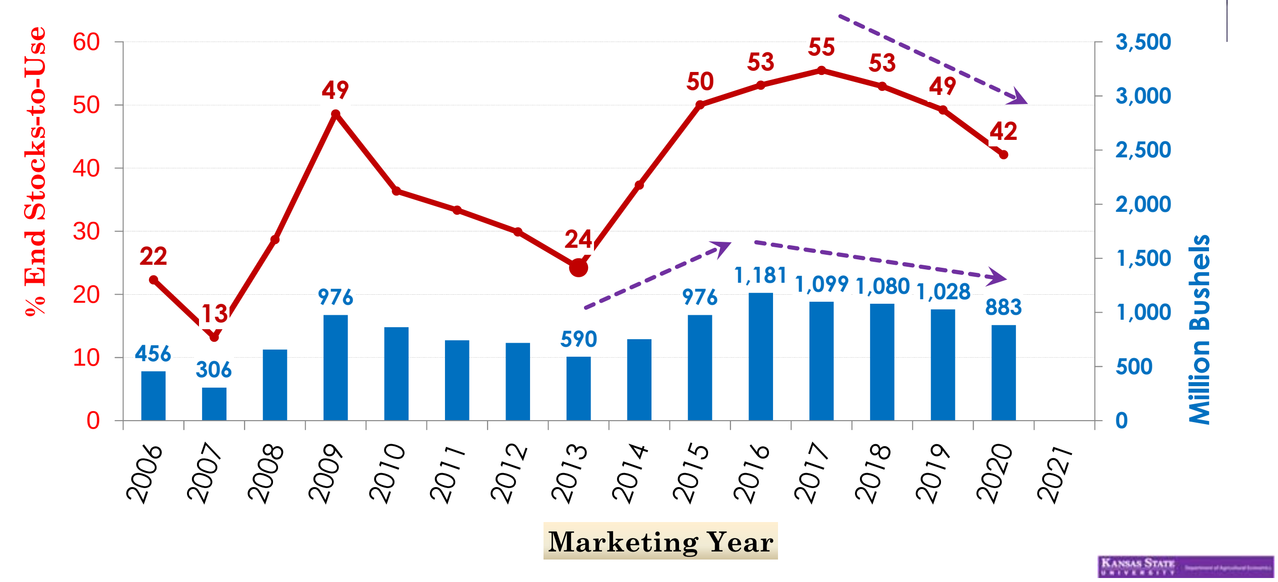
For "Old Crop" MY 2019/20 & "New Crop" MY 2020/21

28



U.S. Wheat Ending Stocks & % Stx/Use

29

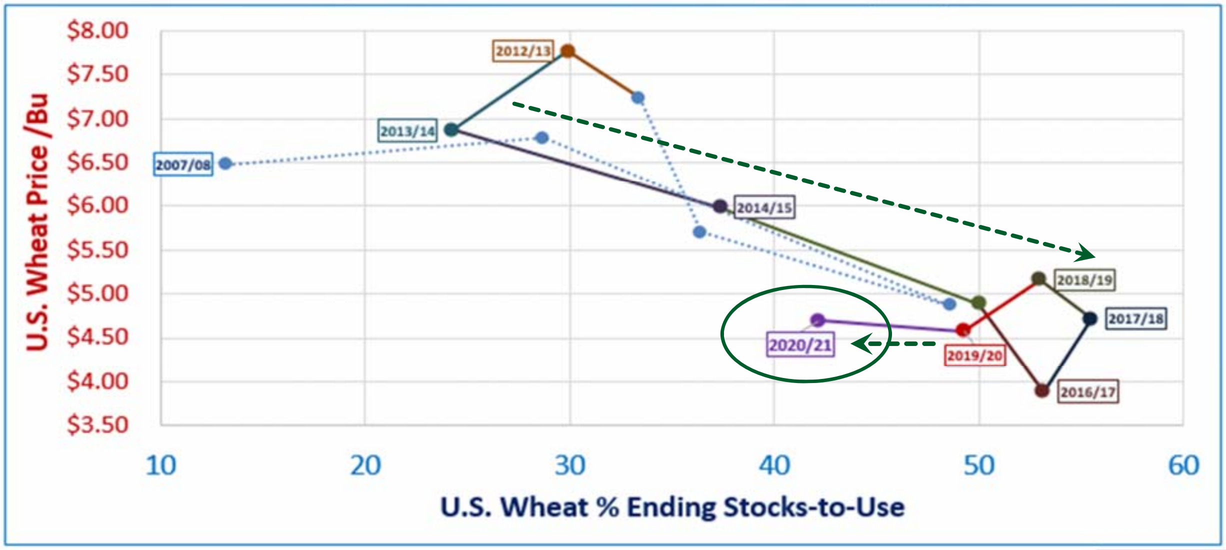


U.S. Wheat Ending Stocks/Use & Prices

30

U.S. Wheat Ending Stocks/Use & Prices

31



World Wheat Production

32

Country or Region	2019/2020 estimate	2020/2021 forecast	Change from September 11	Change from 2019/2020
		---------------- *Million Tons* ----------------		
World	764.5	773.1	2.6	8.6
United States	52.6	49.7	-0.3	-2.9
Foreign	711.9	723.4	2.9	11.5
Argentina	19.8	19.0	-0.5	-0.8
Canada	32.3	35.0	-1.0	2.7
Australia	15.2	28.5	--	13.3
European Union	154.9	136.7	0.6	-18.2
Turkey	17.5	18.5	--	1.0
Russia	73.6	83.0	5.0	9.4
Ukraine	29.2	25.5	-1.5	-3.7
Kazakhstan	11.5	12.5	--	1.0
China	133.6	136.0	--	2.4
India	103.6	107.6	--	4.0
Northwest Africa	9.4	7.5	-0.1	-1.9

-- No change.

33

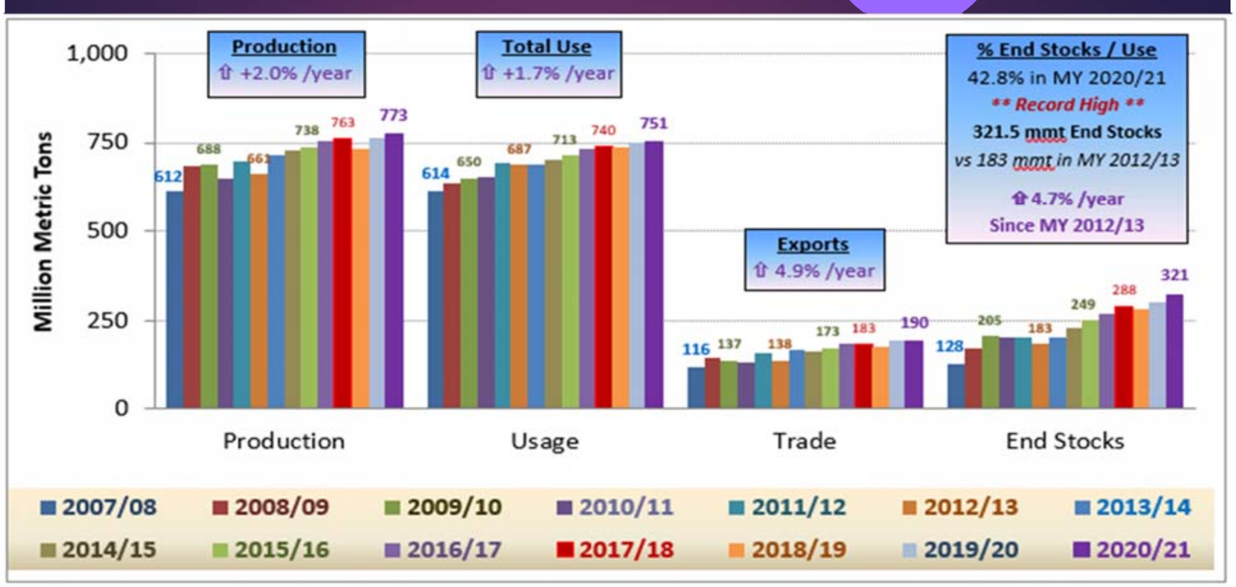
World Wheat Supply and Use

Item	2019/2020 estimate	2020/2021 forecast	Change from September 11	Change from 2019/2020
		---------------- *Million Tons* ----------------		
Beginning stocks	284.0	299.4	-0.4	15.4
Production	764.5	773.1	2.6	8.6
Total Supply	1,048.5	1,072.5	2.2	24.0
Feed use	139.1	134.6	**	-4.5
Total use	749.1	751.0	0.1	1.9
Trade	191.5	189.9	0.5	-1.6
Ending Stocks	299.4	321.5	2.1	22.1

** Rounds to zero.

World Wheat Supply, Use & Stocks

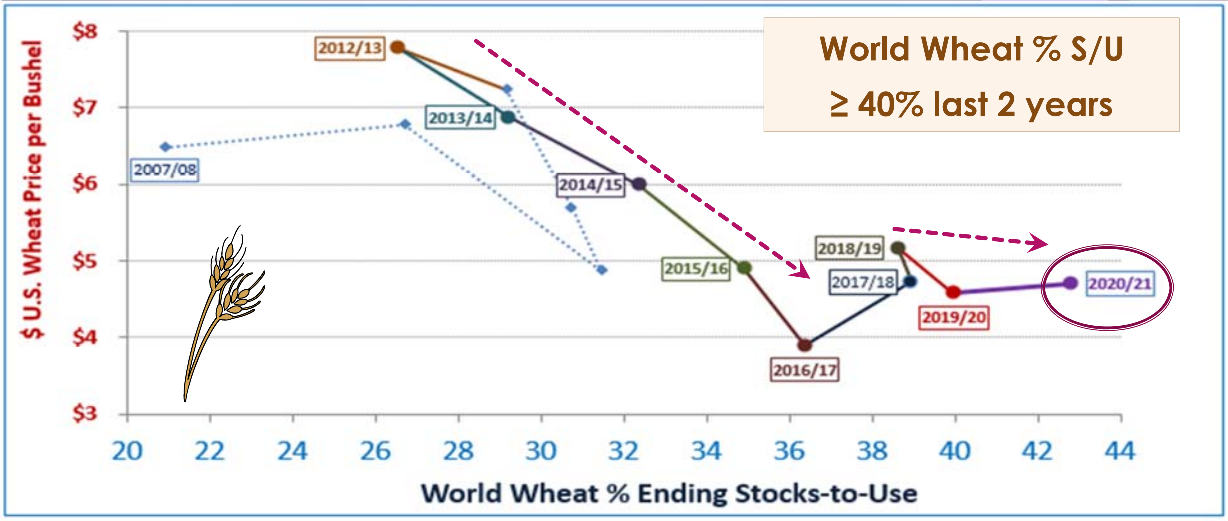
34



U.S. Wheat Price ($) vs World % Stx/Use

35

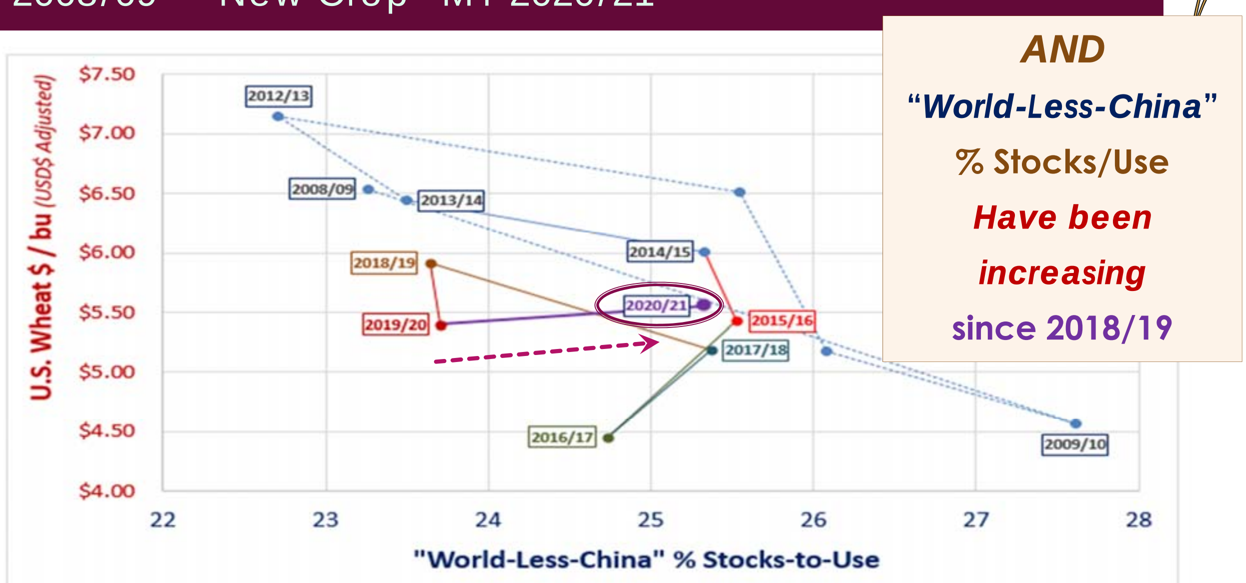
MY 2007/08 – "New Crop" MY 2020/21



U.S. Wheat$^{USD\text{-}Adj}$ $ vs Non-China % Stx/Use

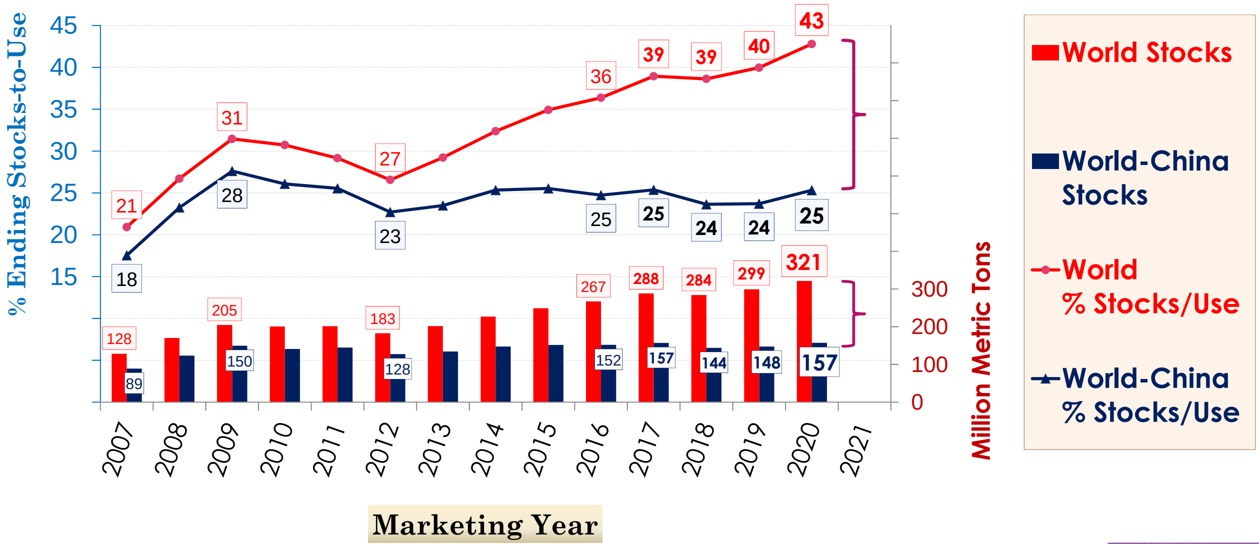
36

MY 2008/09 – "New Crop" MY 2020/21



48

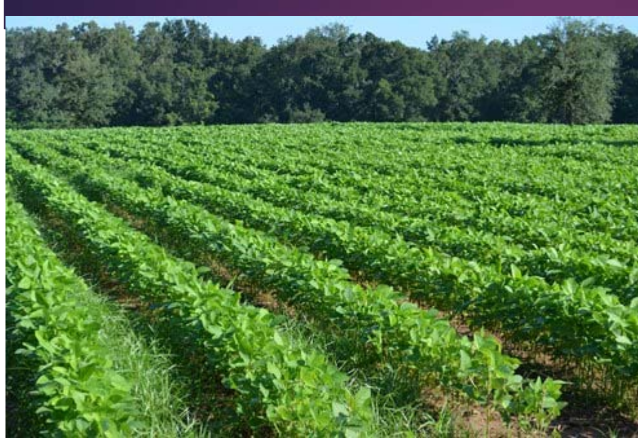
World & *World-less-China* WHEAT Stocks & %S/U

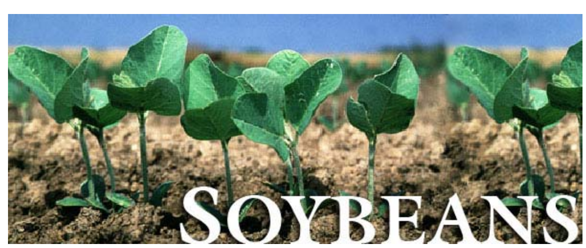


Kansas State University Department of Agricultural Economics

38

Soybean Markets





Kansas State University Department of Agricultural Economics

U.S. Soybean Stocks

- **Soybean**: "*Large*" Stocks & % S/U
  - **End Stocks 2020/21** ⇨ 290 mln bu *(Down vs 523 mb last year)*
  - **% Stocks/Use 2020/21** ⇨ 6.4% S/U *(Down vs 13.2% last year)*

U.S. Soybeans Supply and Demand

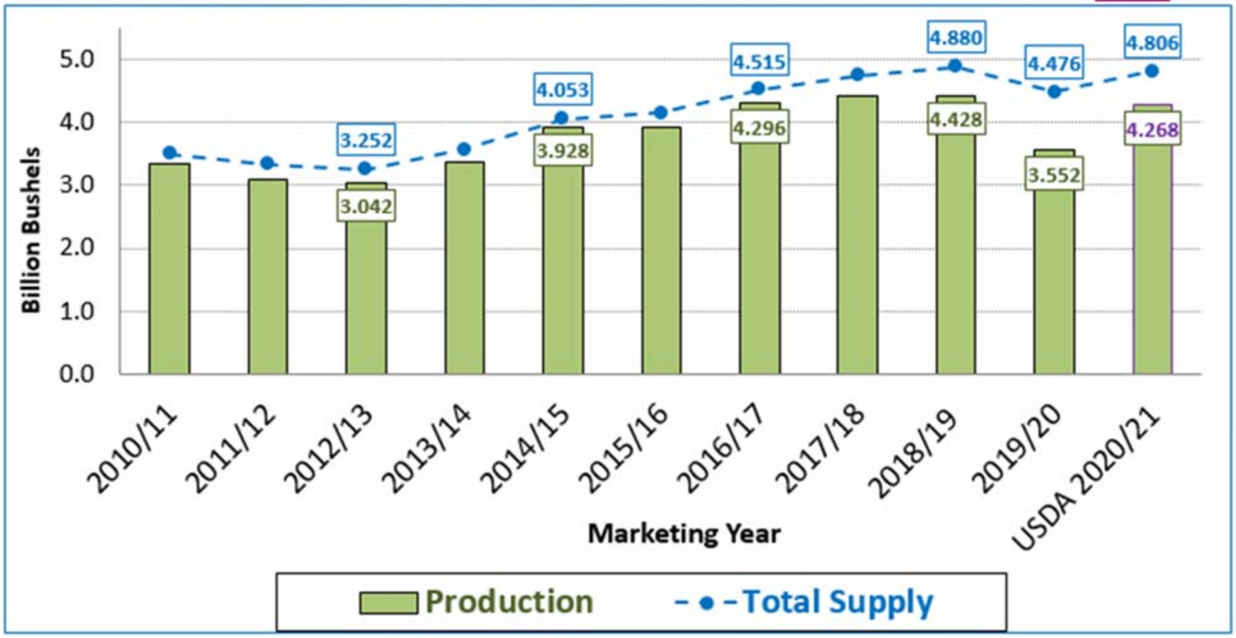
Item	2019/2020 estimate	2020/2021 forecast	Change from September 11	Change from 2019/2020
Planted area (million acres)	76.1	83.1	-0.7	7.0
Harvested area (million acres)	74.9	82.3	-0.7	7.4
Yield (bushels per acre)	47.4	51.9	-0.1	4.5
	------------ *Million bushels* ------------			
Beginning stocks	909	523	-51	-386
Production	3,552	4,268	-45	716
Imports	15	15	--	0
Total supply	4,476	4,806	-96	330
Crush	2,165	2,180	--	15
Seed and Residual	112	136	-1	24
Domestic use	2,277	2,316	-1	39
Exports	1,676	2,200	75	524
Total use	3,953	4,516	74	563
Ending stocks	523	290	-170	-233
	----------------- *Percent* -----------------			
Stocks to use ratio	13.2	6.4	-3.9	-6.8
	------------ *Dollars per bushel* ------------			
Average market price	8.57	9.80	0.55	1.23

-- No change.

October 9, 2020

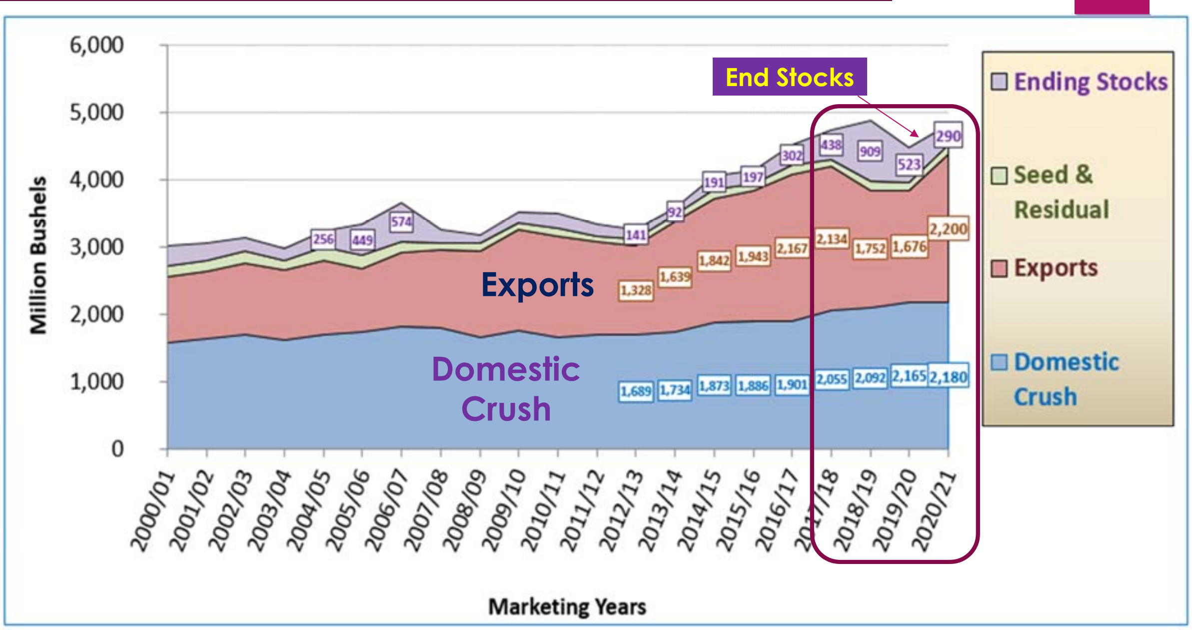
U.S. Soybean Production & Supplies

41



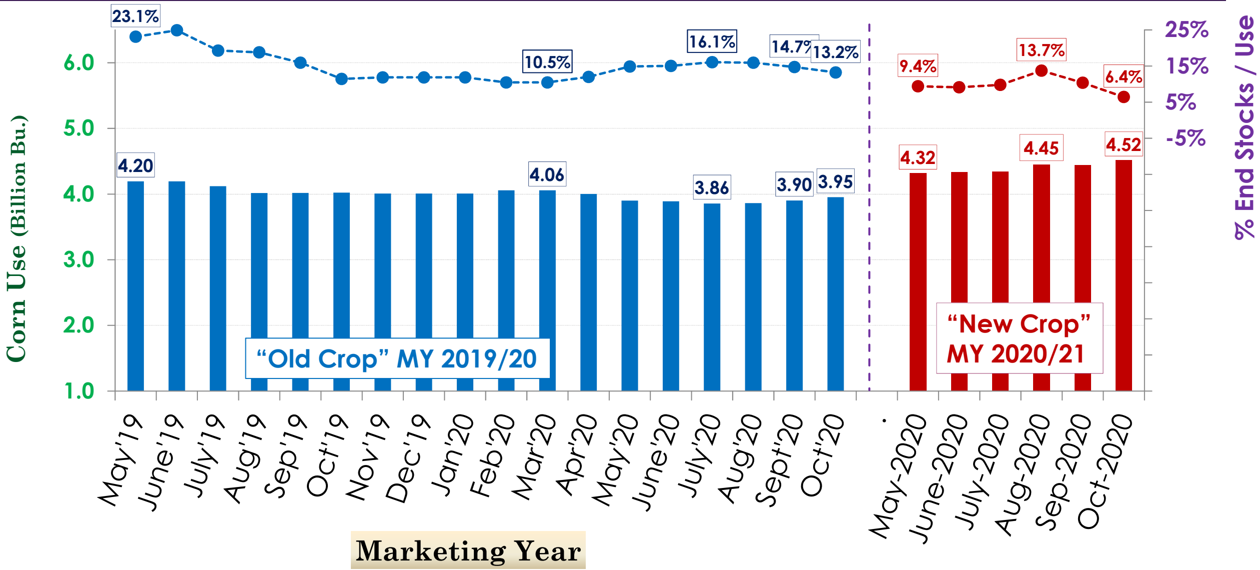
U.S. Soybean Use & End Stocks

42

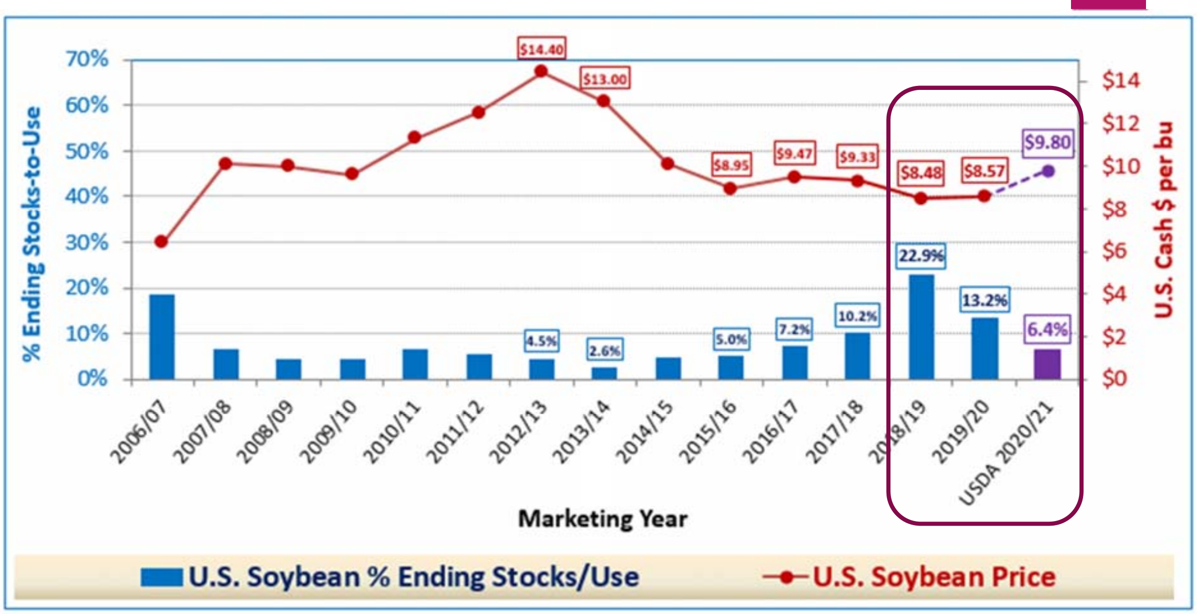


U.S. Soybean Total Use Projections (USDA)

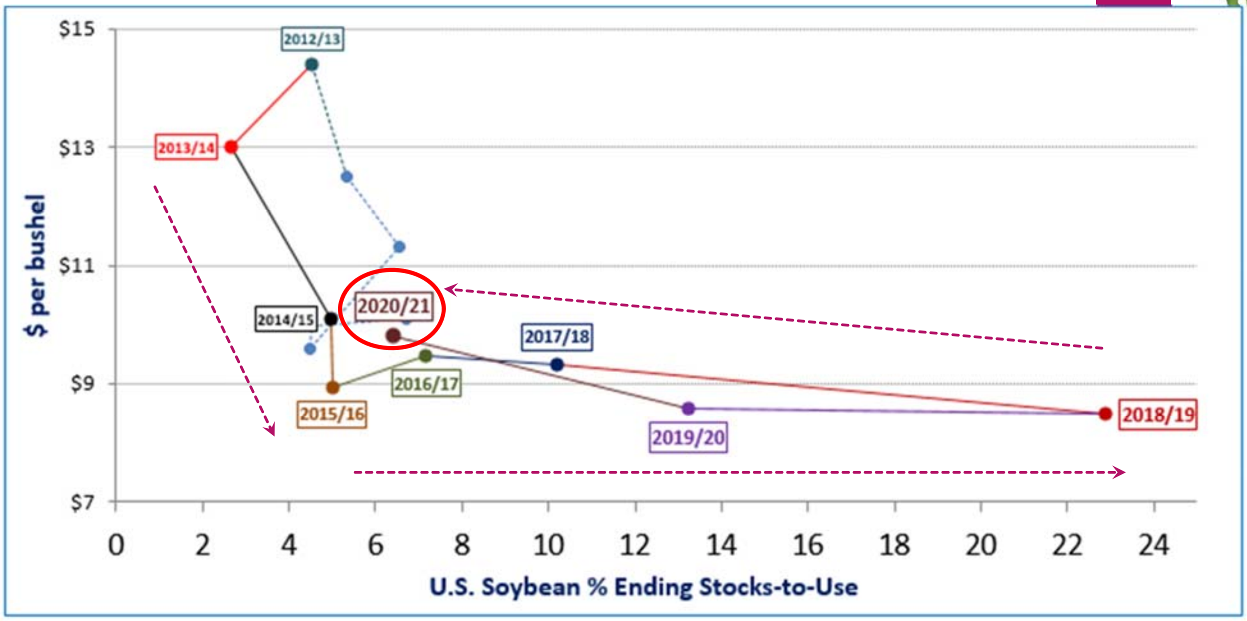
For "Old Crop" MY 2019/20 & "New Crop" MY 2020/21



U.S. Soybean % Stocks/Use vs Price$



U.S. Soybean % Stocks/Use vs Price$



World Soybean Production

Country or Region	2019/2020 estimate	2020/2021 forecast	Change from September 11	Change from 2019/2020
		---------------- *Million Tons* ----------------		
World	336.6	368.5	-1.3	31.9
United States	96.7	116.2	-1.2	19.5
Foreign	239.9	252.3	-0.1	12.4
Argentina	49.0	53.5	--	4.5
Brazil	126.0	133.0	--	7.0
Paraguay	9.9	10.2	--	0.4
Canada	6.0	6.0	--	**
India	9.3	11.2	--	1.9
China	18.1	17.5	--	-0.6

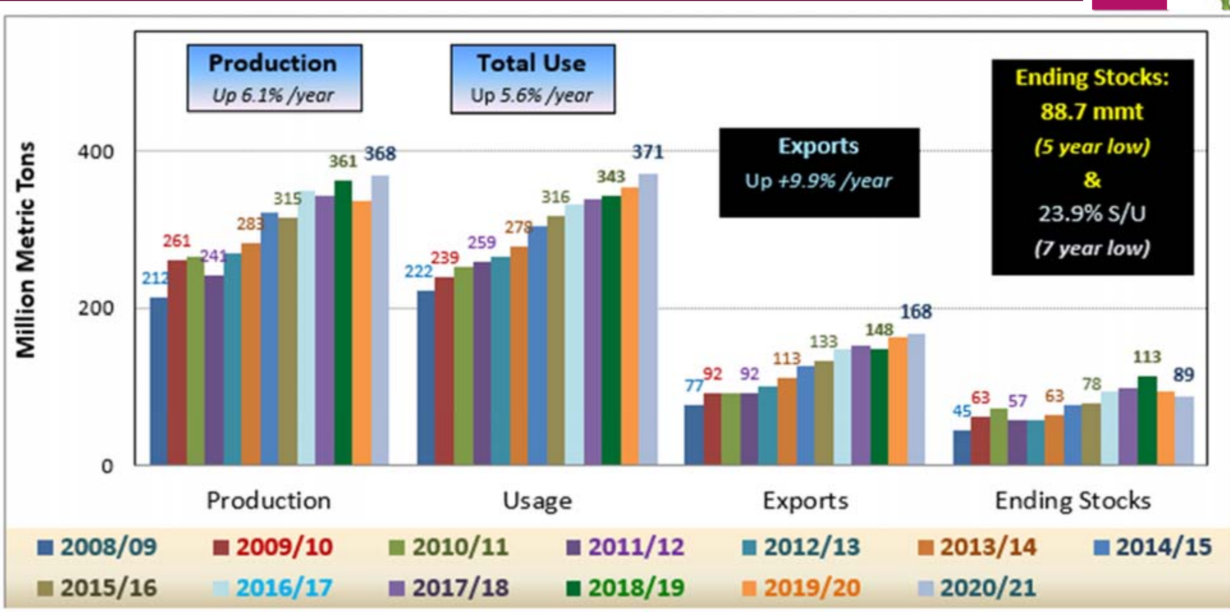
-- No change.

World Soybean Supply and Use

Item	2019/2020 estimate	2020/2021 forecast	Change from September 11	Change from 2019/2020
		---------------- Million Tons ----------------		
Beginning stocks	113.0	93.8	-2.3	-19.3
Production	336.6	368.5	-1.3	31.9
Total Supply	449.6	462.2	-3.5	12.6
Crush	308.7	322.4	1.6	13.7
Total use	354.3	370.6	1.5	16.3
Trade	164.6	167.9	1.5	3.3
Ending Stocks	93.8	88.7	-4.9	-5.1
Addendum				
Beginning stocks				
Argentina plus Brazil	61.7	46.7	0.9	-14.9
Imports*				
China	97.4	100.0	1.0	2.6

*From all sources.

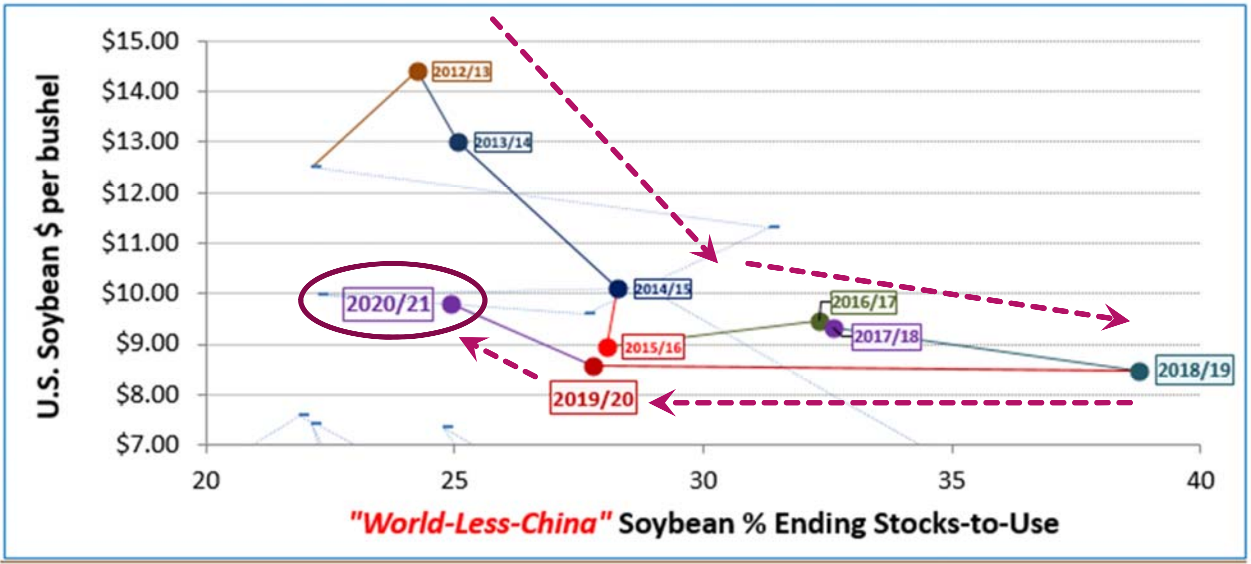
World Soybean Supply, Use & Stocks



U.S. Soybean$ vs World %Stx/Use

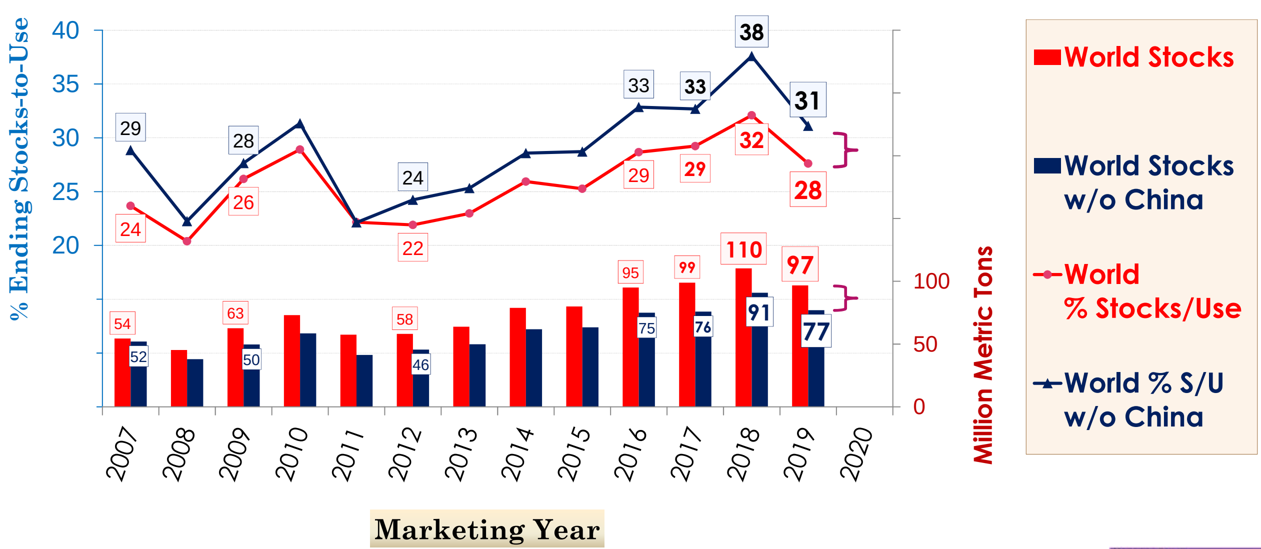
MY 2007/08 through "New Crop" MY 2020/21

49



75

World & *World-less-China* SOYBEAN Stocks & %S/U




Questions?
Daniel O'Brien – Extension Ag Economist
Blog: www.ksugrains.wordpress.com
KSUGrains on Twitter
www.AgManager.info
KANSAS STATE UNIVERSITY
Department of Agricultural Economics