China's Potential Future Imports of Feedgrains and Oilseeds

Bryan Lohmar
Director for China, U.S. Grains Council

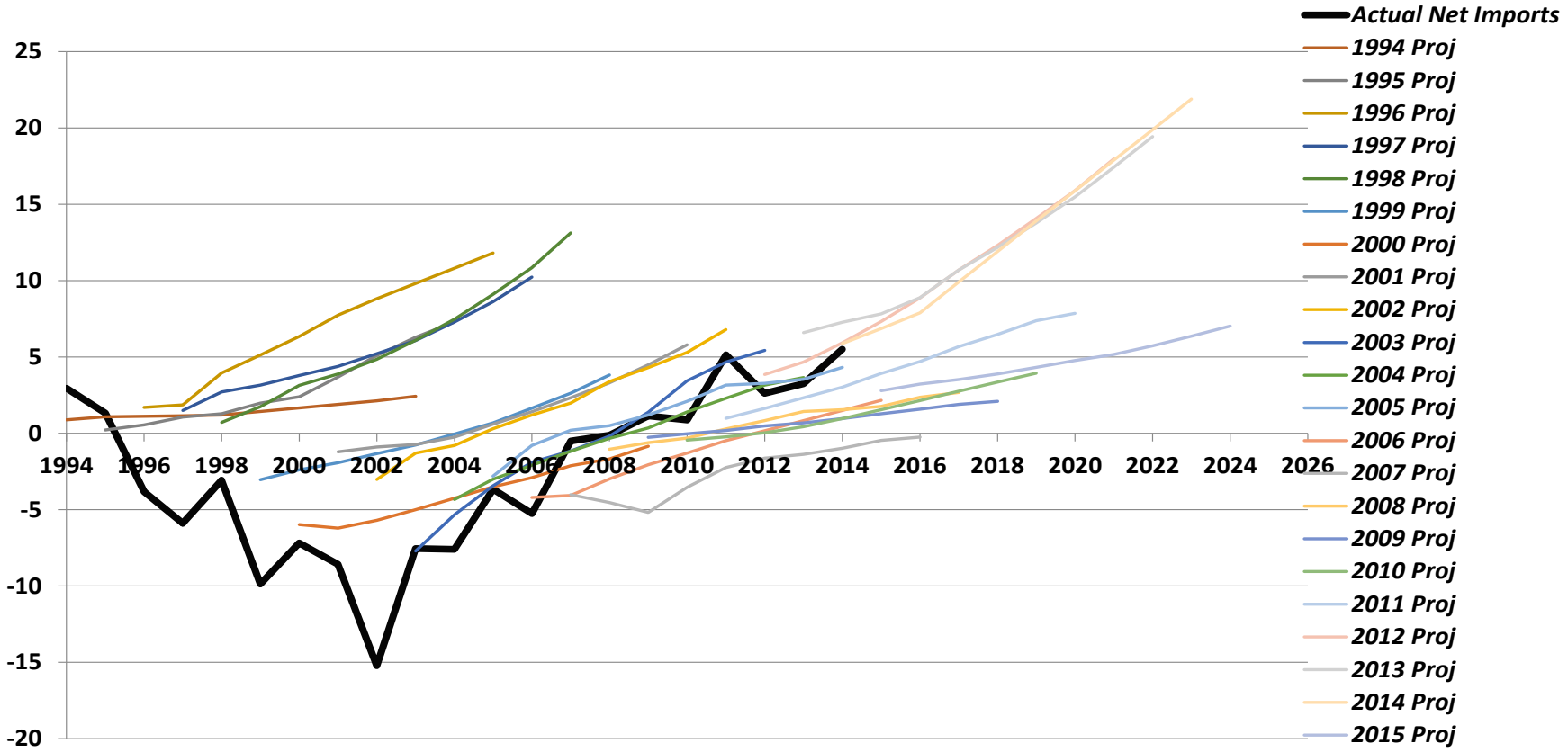
USDA Agricultural
Outlook Forum
Feb 25-26, 2016

U.S. GRAINS COUNCIL

Developing markets. >> Enabling trade. >> Improving lives.

Few Known Knowns in China

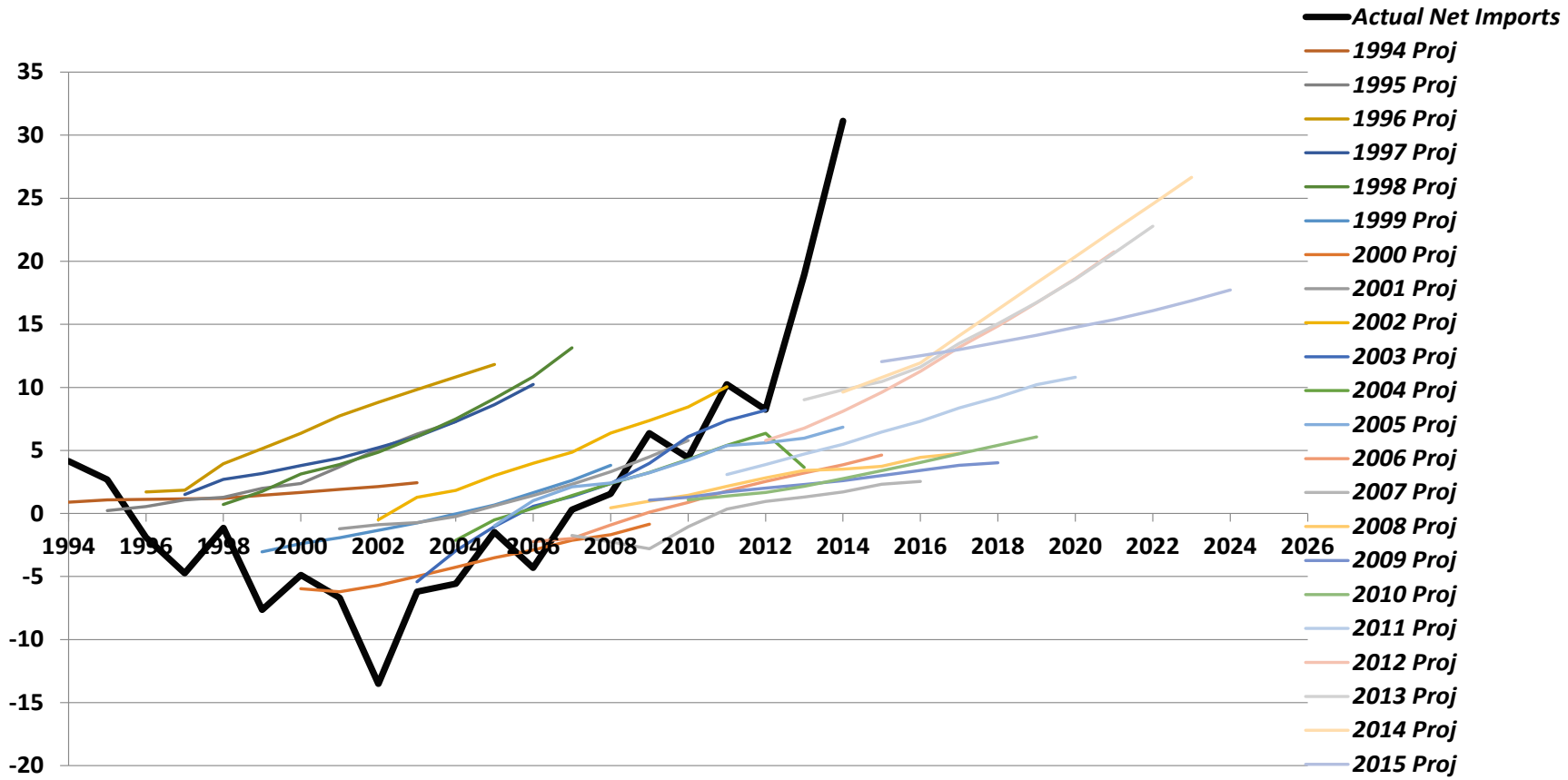
China Corn Net Imports and Projections
USDA Baseline: 1994-2015



U.S. GRAINS COUNCIL

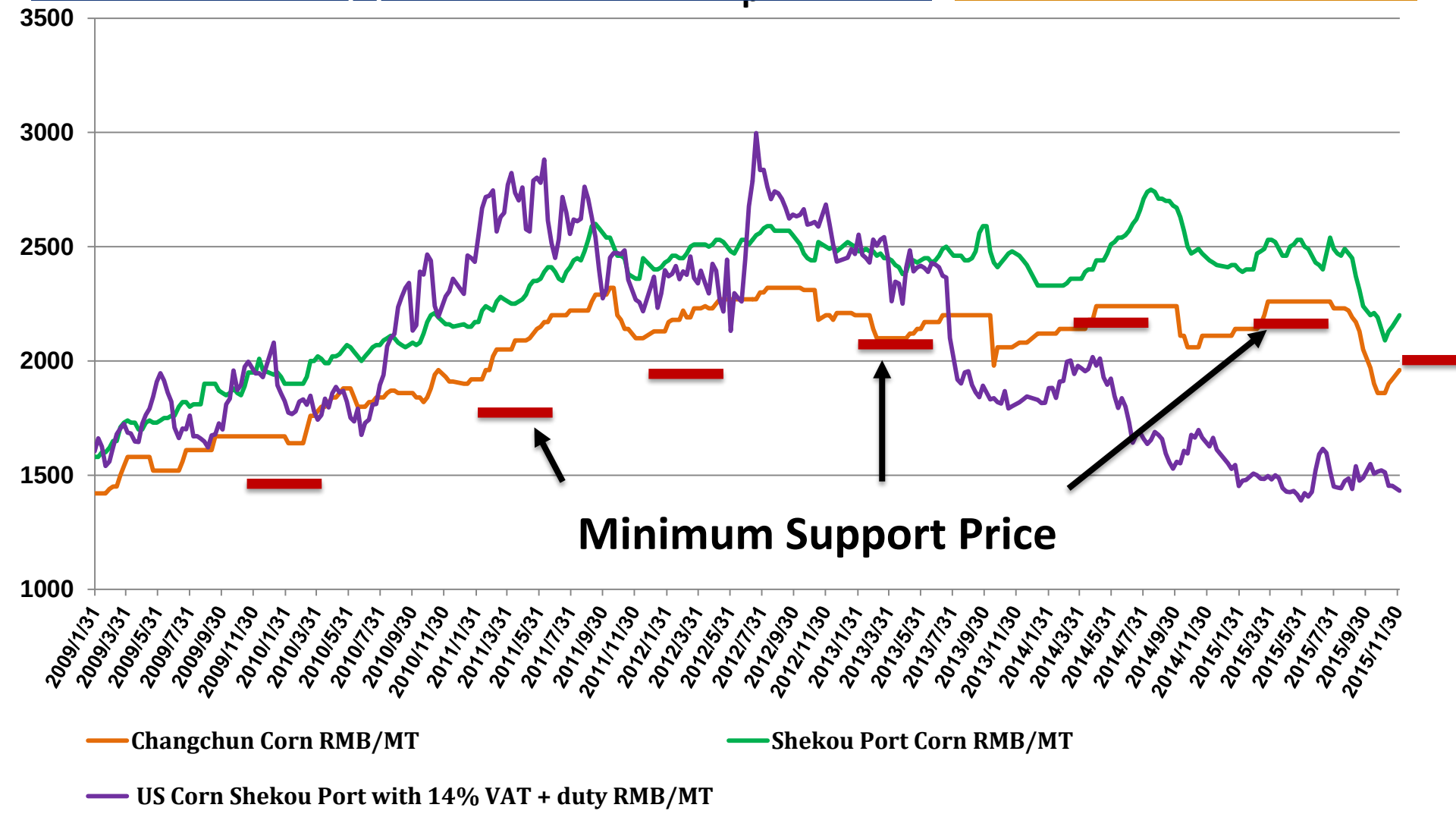
Few Known Knowns in China

China Corn, Sorghum, Barley, and DDGS Net Imports and Projections
USDA Baseline: 1994-2015



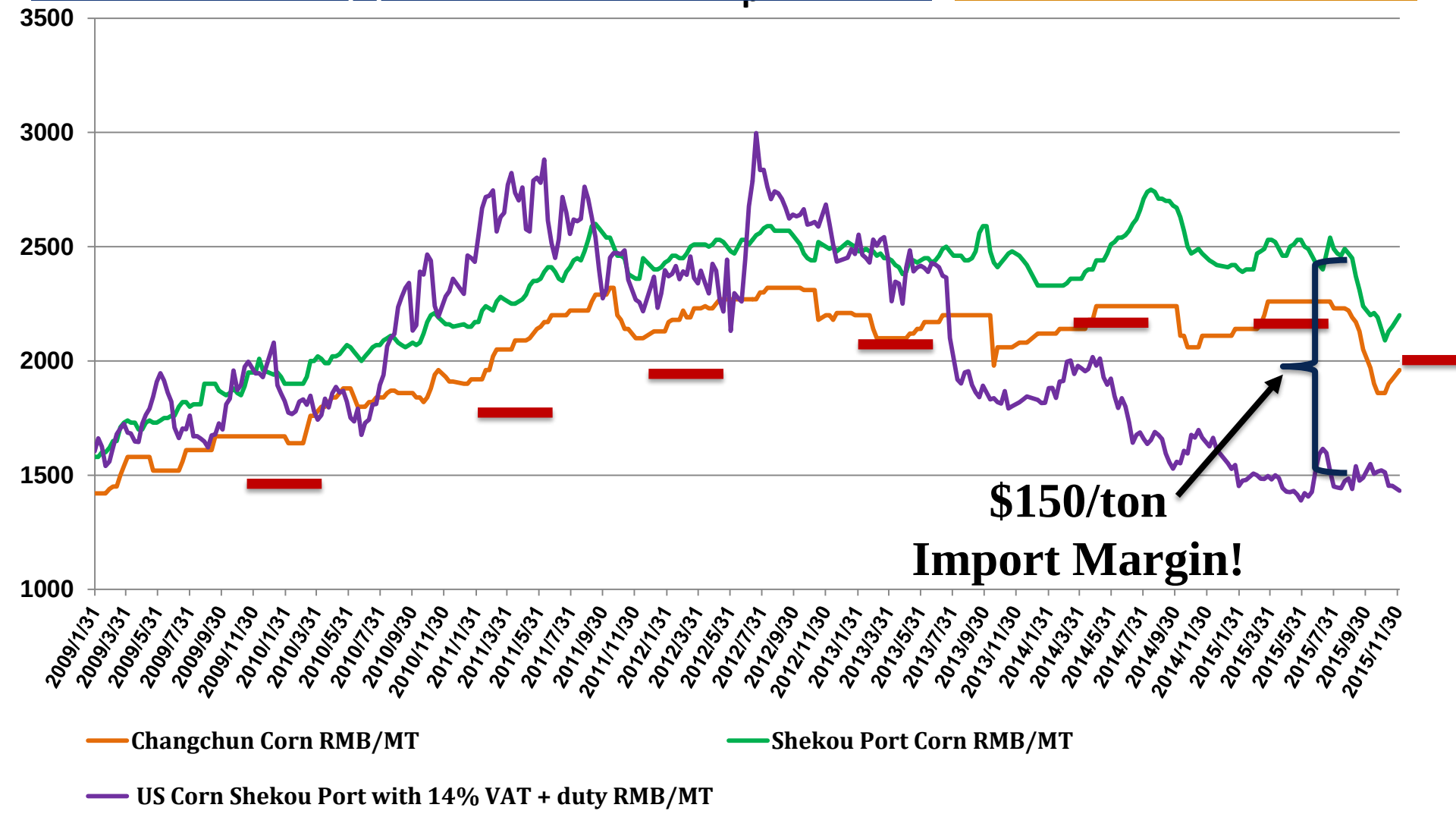
U.S. GRAINS COUNCIL

Large Import Margins Due to Minimum Support Prices



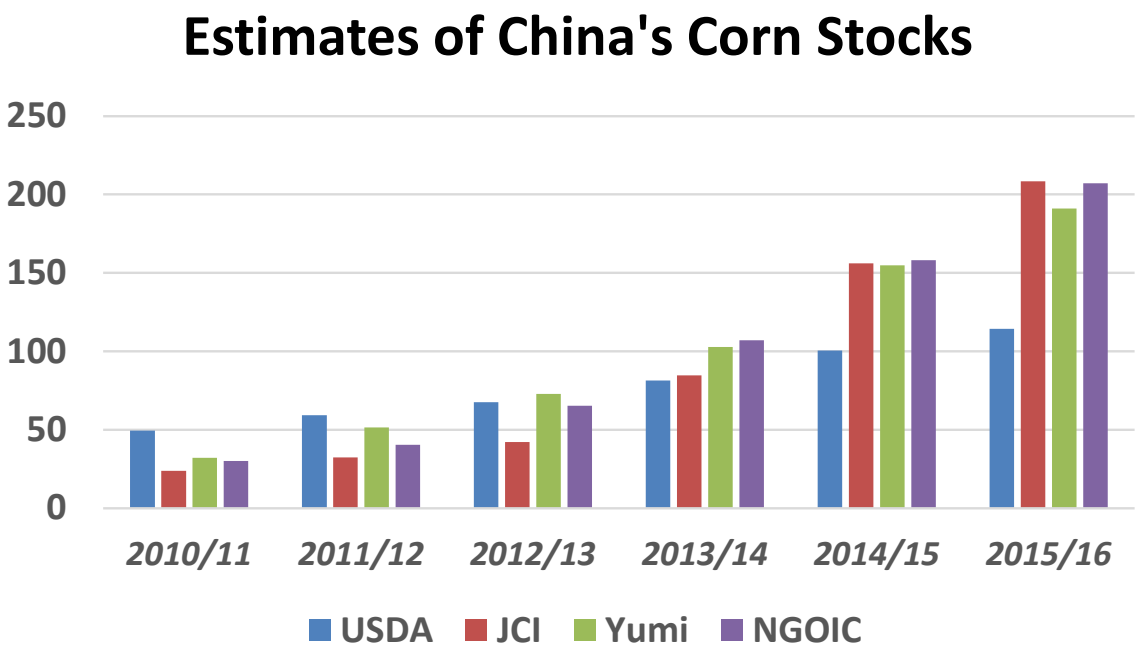
U.S. GRAINS COUNCIL

Large Import Margins Due to Minimum Support Prices



U.S. GRAINS COUNCIL

Price Policy Resulting in Large Stocks

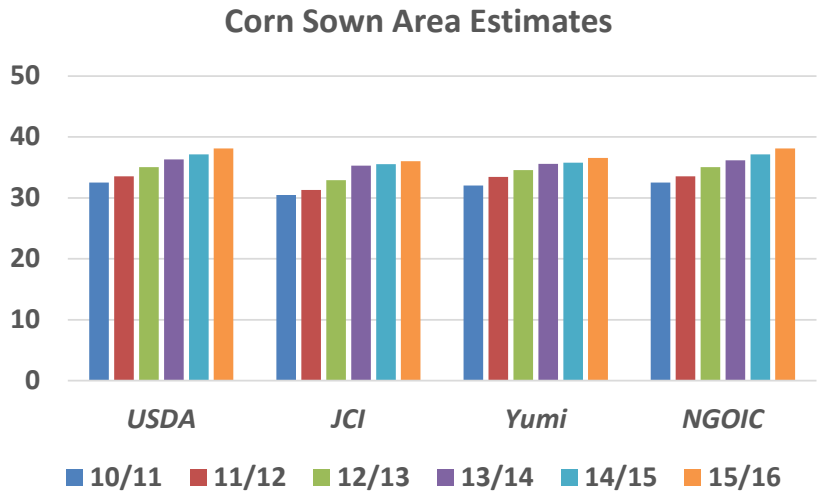


Agreement among China information services and government that corn Carryout in 2014/15 was 150 mmt.

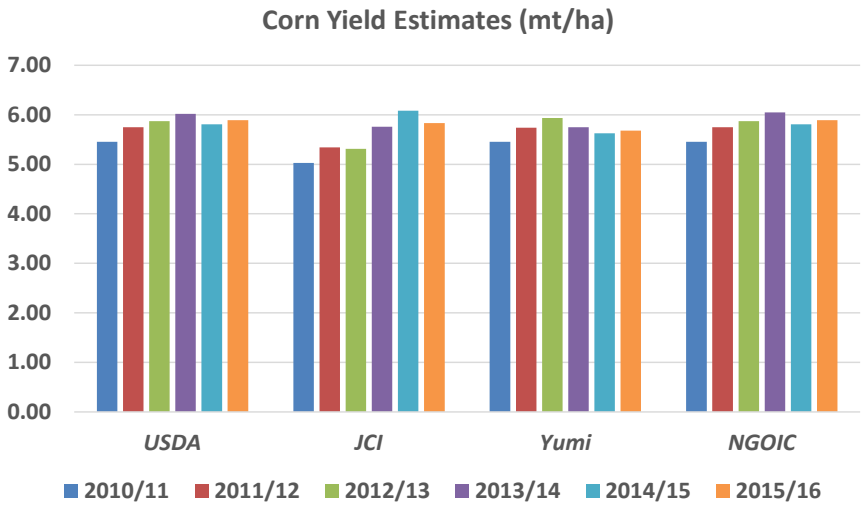
Both independent services revised S&Ds to match government estimates in spring, 2014.

U.S. GRAINS COUNCIL

Is Production Up?



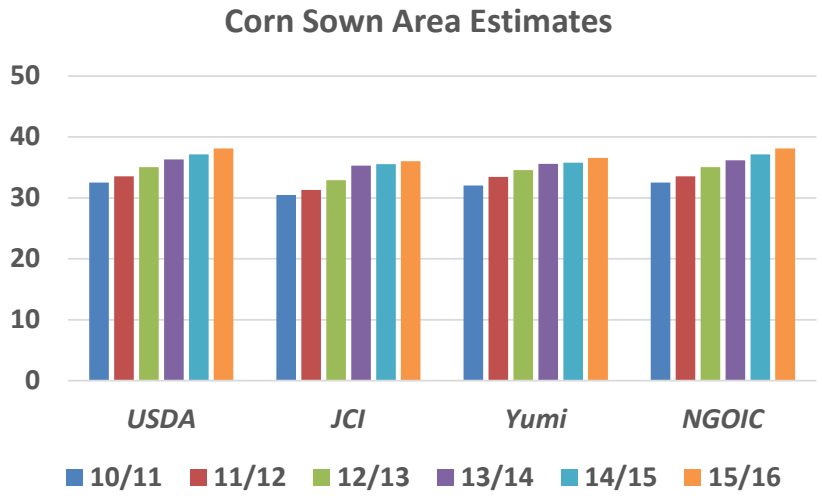
Corn sown area has gone up
(2010-2015)
Up 5-6 mha, or 14-18 percent

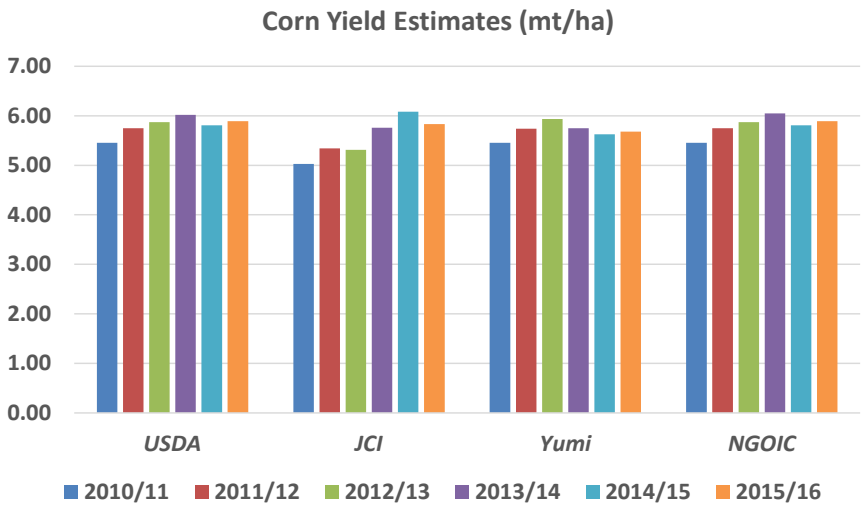


Corn yields have gone…
(2012-2014)
JCI – up!
Yumi – down!
NGOIC & USDA – up and down!

U.S. GRAINS COUNCIL

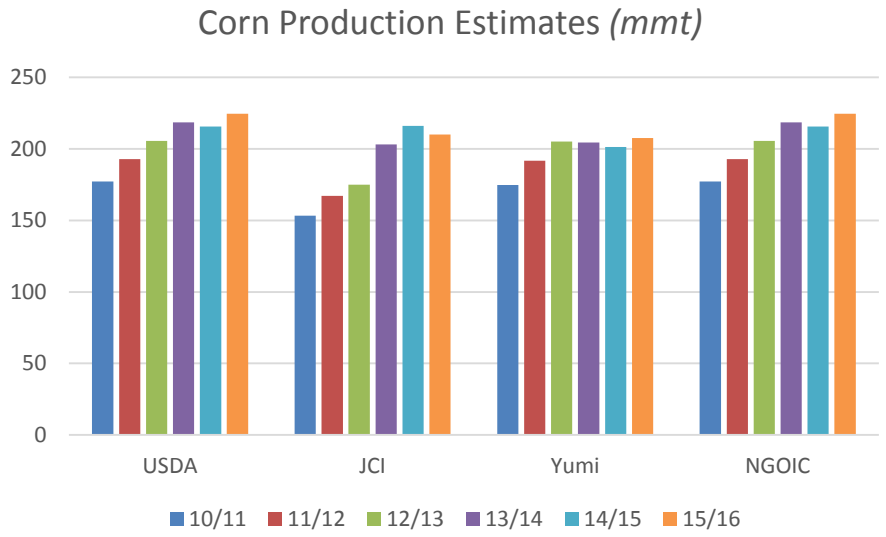
Is Production Up?





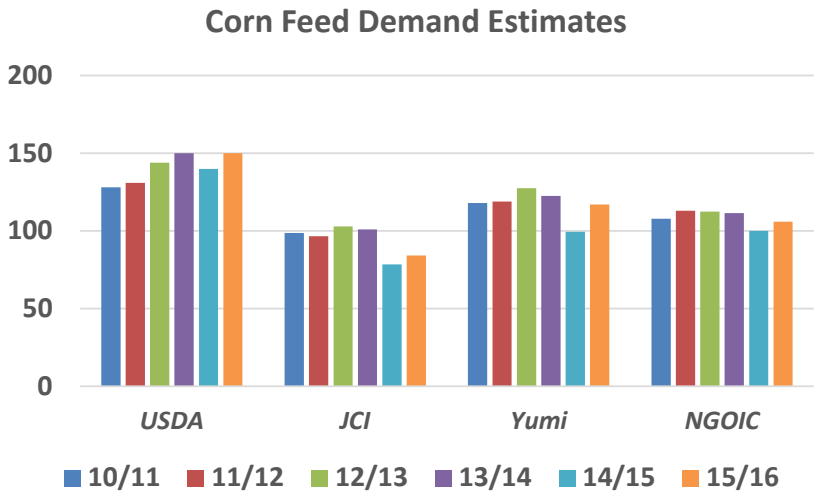
All together, corn production has gone up by 19 to 37 percent (or 33 to 57 mmt) since 2010

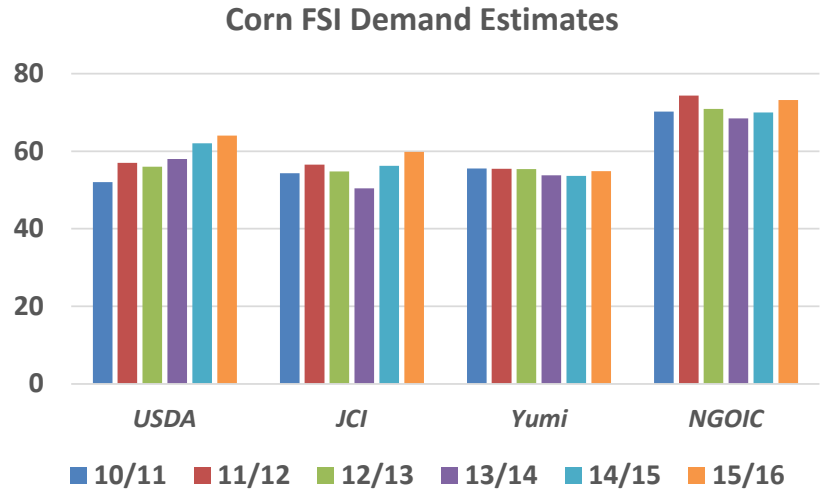
=> Due mostly to increased sown area



U.S. GRAINS COUNCIL

Is Demand Down?





Feed demand estimates vary widely

JCI – less than 100 mmt

USDA – up to 150 mmt

Feed demand went down in 14/15

Yumi and JCI – by 23 mmt

NGOIC and USDA – by 10-11 mmt

FSI demand estimates vary widely

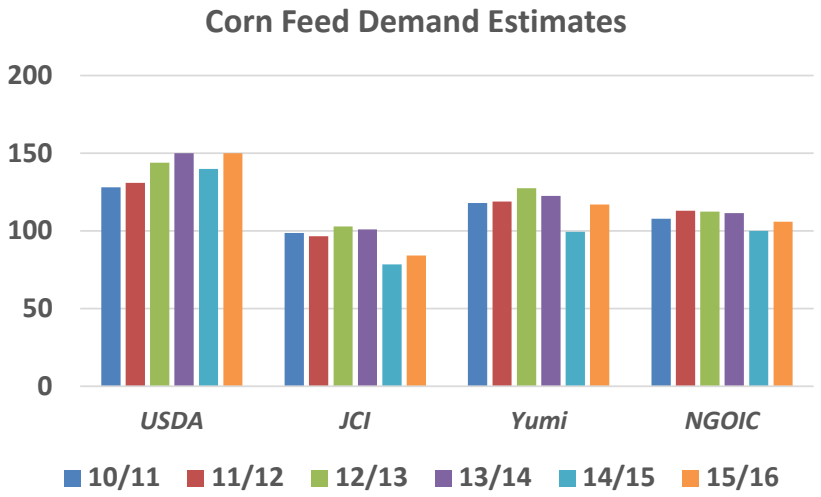
NGOIC – over 70 mmt

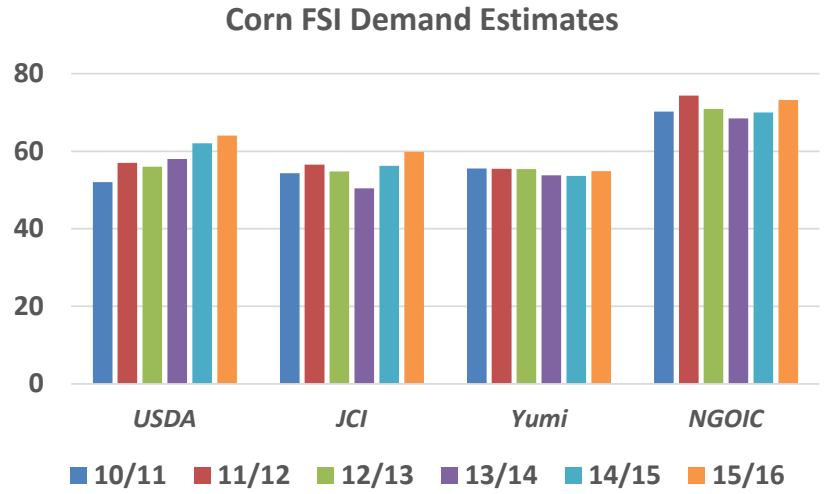
Yumi – closer to 50 mmt

No clear trends

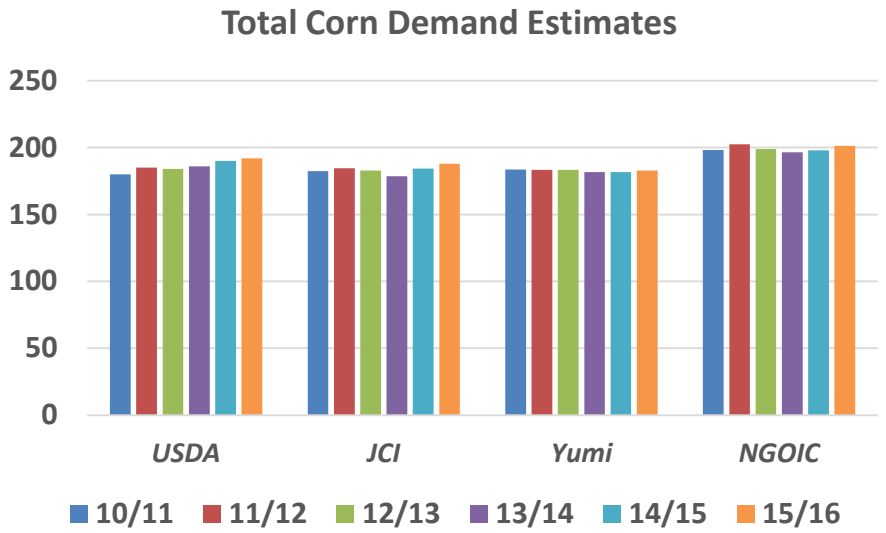
U.S. GRAINS COUNCIL

Is Demand Down?





All together, corn demand appears stable, despite 30-40 mmt imports of corn substitutes in 14/15!



U.S. GRAINS COUNCIL

What is Really Going On?

There is very little consensus on corn supply and demand in China (except for carry out!)

How do the feed demand estimate compare with animal production estimates?

How do animal production estimates compare with animal product consumption estimates?

U.S. GRAINS COUNCIL

China's Missing Pork

2014 Official Pork Production: 56.7 mmt
⇒ 42 kg/year per capita consumption

China's official 2014 consumption estimate is only 20 kg/year

Rural consumption estimate raised significantly in 2013

Official 2014 Pork Consumption Estimates and Revisions for Food Away From Home *(kg/year)*

	Official Per Capita Consumption	Consumption Away from Home	Total Per Capita Consumption
Urban	20.8	11.2	32
Rural	19.2	4.8	24
Average	20.0	8.0	28.0
		Population *(bln)* =>	1.35
Total Implied Pork Consumption *(mmt)*			**37.8**

U.S. GRAINS COUNCIL

China's Commercial Feed Production Stats Imply 180 mmt of Swine Feed

China's 2014 Commercial Swine Feed Production, Total Implied Feed, and Total Implied Pork *(mmt)*

	Official Production	Implied Feed
Compound Feed	69.4	69.4
Concentrate Feed	13.0	52.1
Feed Premix	3.7	58.8
Total Feed	86.2	180.4

The China Feed Industry Association publishes commercial feed production estimates for

i) Compound feed,
ii) Concentrate feed,
iii) Feed premix

Adjusting the concentrate and premix to estimate "Total Implied Feed" results in 180.4 mmt total swine feed produced in 2014

U.S. GRAINS COUNCIL

China's Commercial Feed Production Stats Imply 180 mmt of Swine Feed

	Official Production	Implied Feed
Compound Feed	69.4	69.4
Concentrate Feed	13.0	52.1
Feed Premix	3.7	58.8
Total Feed	86.2	180.4
Total Implied Pork Production =>		**33.4**

Using a feed to meat conversion ratio of 5.4, the 180.4 mmt of feed would produce 33.4 mmt of pork.

This feed production estimate further corroborates the low pork production estimate

U.S. GRAINS COUNCIL

Other Evidence

Official Ministry of Commerce monthly slaughter estimates, added up over the year, come to about one third the official swine slaughter estimate

Yu and Abler (2013) use the MOA's Research Center for Rural Economy household survey data to estimate pork production and conclude production is about 35.7 mmt in 2009

It just doesn't "seem" right. China, with roughly one tenth the per capita income of EU, has about the same per capita pork consumption?

DRAFT

China's Current Corn Feed Demand is Likely 150 mmt or More

	Per Capita Cons (kg/yr)	*Total Demand (mmt)*	*Convert to Feed*	*Total Feed Demand (mmt)*	*Percent Corn*	*Total Corn Demand (mmt)*
Pork	28	37.8	5.4	204.1	42%	85.8
Poultry Meat	12	16.2	3.0	48.6	45%	21.9
Poultry Eggs	15	20.3	2.5	50.6	45%	22.8
Dairy	17	23.0	2.0	45.9	20%	9.2
Beef	3.6	4.9	10.7	51.8	20%	10.4
				401.1	37%	150.0

U.S. GRAINS COUNCIL

China's Current Corn Feed Demand: DRAFT

China's Current Corn Feed Demand Likely 150 mmt or More

	Per Capita Cons (kg/yr)	*Total Demand (mmt)*	*Convert to Feed*	*Total Feed Demand (mmt)*	*Percent Corn*	*Total Corn Demand (mmt)*
Pork	28	37.8	5.4	204.1	42%	85.8
Poultry Meat	12	16.2	3.0	48.6	45%	21.9
Poultry Eggs	15	20.3	2.5	50.6	45%	22.8
Dairy	17	23.0	2.0	45.9	20%	9.2
Beef	3.6	4.9	10.7	51.8	20%	10.4
				401.1	37%	150.0

109 mmt of other energy feed →

Total energy feed is 259 mmt
Protein meal is 84 mmt
Protein meal inclusion is 24.5%

Feed Ingredients *(mmt)*

Corn	150
Bran	60
Wheat	15
Rice	4
Food Waste	30
SBM	62
Other Meal	22
Forage	58
	401

U.S. GRAINS COUNCIL

DRAFT

China's Potential Corn Feed Demand is Over 280 mmt

	Per Capita Cons (kg/yr)	*Total Demand (mmt)*	*Convert to Feed*	*Total Feed Demand (mmt)*	*Percent Corn*	*Total Corn Demand (mmt)*
Pork	40	54.0	4.6	248.4	55%	136.6
Poultry Meat	30	40.5	2.8	113.4	60%	68.0
Poultry Eggs	17	23.0	2.2	50.5	60%	30.3
Dairy	40	54.0	1.8	97.2	25%	24.3
Beef	6	8.1	9.3	75.6	30%	22.7
				585.1	48%	281.9

U.S. GRAINS COUNCIL

China's Potential Corn Feed Demand: **DRAFT**

China's Potential Corn Feed Demand is Over 280 mmt

	Per Capita Cons (kg/yr)	*Total Demand (mmt)*	*Convert to Feed*	*Total Feed Demand (mmt)*	*Percent Corn*	*Total Corn Demand (mmt)*
Pork	40	54.0	4.6	248.4	55%	136.6
Poultry Meat	30	40.5	2.8	113.4	60%	68.0
Poultry Eggs	17	23.0	2.2	50.5	60%	30.3
Dairy	40	54.0	1.8	97.2	25%	24.3
Beef	6	8.1	9.3	75.6	30%	22.7
				585.1	48%	281.9

90 mmt of other energy feed →

Total energy feed is 371 mmt
Protein meal is 114 mmt
Protein meal inclusion is 23.5%

Feed Ingredients *(mmt)*

Corn	281
Bran	55
Wheat	5
Rice	2
Food Waste	28
SBM	94
Other Meal	20
Forage	100
	585

U.S. GRAINS COUNCIL

Cumulative Annual Growth Rates (CAGR)

CAGRs for Individual Feed Ingredients Under A 10-Year and 20-Year Scenario

	Current *(mmt)*	Potential *(mmt)*	10-year CAGR	20-Year CAGR
Total Feed	401	585	3.8%	1.9%
Enrgey Feed	259	371	3.7%	1.8%
Corn	150	281	6.5%	3.2%
Other	109	90	-1.9%	-1.0%
Protein Meal	84	114	3.1%	1.5%
Soybean	62	94	4.2%	2.1%
Other	22	20	0.0%	0.0%
Meal/Total	24.5%	23.5%		
Forage	58	100	5.6%	2.8%

Total feed demand exhibits an an annual average growth rate of: 3.8 percent if achieved in 10 years 1.9 percent if achieved in 20 years

U.S. GRAINS COUNCIL

Cumulative Annual Growth Rates (CAGR)

CAGRs for Individual Feed Ingredients Under A 10-Year and 20-Year Scenario

	Current *(mmt)*	Potential *(mmt)*	10-year CAGR	20-Year CAGR
Total Feed	401	585	3.8%	1.9%
Enrgey Feed	259	371	3.7%	1.8%
Corn	150	281	6.5%	3.2%
Other	109	90	-1.9%	-1.0%
Protein Meal	84	114	3.1%	1.5%
Soybean	62	94	4.2%	2.1%
Other	22	20	0.0%	0.0%
Meal/Total	24.5%	23.5%		
Forage	58	100	5.6%	2.8%

Corn feed demand grows faster
6.5 percent annually if in 10 years
3.2 percent annually if in 20 years

U.S. GRAINS COUNCIL

Cumulative Annual Growth Rates (CAGR)

CAGRs for Individual Feed Ingredients Under A 10-Year and 20-Year Scenario

	Current *(mmt)*	Potential *(mmt)*	10-year CAGR	20-Year CAGR
Total Feed	401	585	3.8%	1.9%
Enrgey Feed	259	371	3.7%	1.8%
Corn	150	281	6.5%	3.2%
Other	109	90	-1.9%	-1.0%
Protein Meal	84	114	3.1%	1.5%
Soybean	62	94	4.2%	2.1%
Other	22	20	0.0%	0.0%
Meal/Total	24.5%	23.5%		
Forage	58	100	5.6%	2.8%

Meal demand growth will slow but soybean demand for crush rises to nearly 120 mmt

U.S. GRAINS COUNCIL

Cumulative Annual Growth Rates (CAGR)

CAGRs for Individual Feed Ingredients Under A 10-Year and 20-Year Scenario

	Current *(mmt)*	Potential *(mmt)*	10-year CAGR	20-Year CAGR
Total Feed	401	585	3.8%	1.9%
Enrgey Feed	259	371	3.7%	1.8%
Corn	150	281	6.5%	3.2%
Other	109	90	-1.9%	-1.0%
Protein Meal	84	114	3.1%	1.5%
Soybean	62	94	4.2%	2.1%
Other	22	20	0.0%	0.0%
Meal/Total	24.5%	23.5%		
Forage	58	100	5.6%	2.8%

Meal demand growth will slow but soybean demand for crush rises to nearly 120 mmt

Even while protein meal inclusion softens a little

U.S. GRAINS COUNCIL

Can this be Achieved with Domestic Corn Production?

Additional corn production growth will likely be slow

⇒ ***Nearly 70 percent of corn production growth in past 20 years is due to expansion of sown area, not yield growth***

⇒ ***Yields are 60-75 percent U.S. yields with much of this due to plant population, which are roughly 75 percent U.S. levels***

⇒ ***But even at this low plant population, corn has "tip back," and indication that plant population exceeds soil nutrient levels***

U.S. GRAINS COUNCIL

China Corn Sown Area is Set to Go Down

China's Ministry of Agriculture plans to reduce corn sown area by 10 million mu/year for the next 5 years

=> Just under 2 percent/year, for a total of 10 percent

Some policy advocates are even suggesting set aside programs to allow land to recover from many years of intensive cultivation

The U.S. set aside 25 percent of its farmland at the height of the large commodity stocks in the 1980s

China has always sought food or grain self-sufficiency

=> ***Recent policies to keep corn prices high are generating increasingly large ending stocks by encouraging production while discouraging demand.***

=> ***The 2013 "Grain Security Policy" removes corn from being held to the "95 percent self-sufficiency" standard of the last 20 years.***

=> ***The 2013 policy is expected to be embodied in the 13th 5-year plan (2016-2021)***

Some Scenarios: Initial Conditions

Looking at the implications of the above arguments on China's long-term corn supply, demand, and trade, we can start with:

(CAGR)	*2015*
Feed Demand (3.2%)	150.0
Industrial Demand (1.5%)	70.0
Total Demand	220
Imports (inc substitutes)	40
Carry In	100
Production (mmt)	230
Area (mha)	37.1
Yield (1.5%)	6.20
Carry Out	150

Corn feed demand = 150 mmt, grows at 3.2 percent/year

U.S. GRAINS COUNCIL

Some Scenarios: Initial Conditions

Looking at the implications of the above arguments on China's long-term corn supply, demand, and trade, we can start with:

(CAGR)	*2015*
Feed Demand (3.2%)	150.0
Industrial Demand (1.5%)	70.0
Total Demand	220
Imports (inc substitutes)	40
Carry In	100
Production (mmt)	230
Area (mha)	37.1
Yield (1.5%)	6.20
Carry Out	150

Corn feed demand = 150 mmt, grows at 3.2 percent/year

Corn industrial demand = 70 mmt, grows at 1.5 percent/year

U.S. GRAINS COUNCIL

Some Scenarios: Initial Conditions

Looking at the implications of the above arguments on China's long-term corn supply, demand, and trade, we can start with:

(CAGR)	*2015*
Feed Demand (3.2%)	150.0
Industrial Demand (1.5%)	70.0
Total Demand	220
Imports (inc substitutes)	40
Carry In	100
Production (mmt)	230
Area (mha)	37.1
Yield (1.5%)	6.20
Carry Out	150

Corn feed demand = 150 mmt, grows at 3.2 percent/year

Corn industrial demand = 70 mmt, grows at 1.5 percent/year

Imports = 40 mmt, corn and substitutes

Carry in = 100 mmt

Some Scenarios: Initial Conditions

Looking at the implications of the above arguments on China's long-term corn supply, demand, and trade, we can start with:

(CAGR)	*2015*
Feed Demand (3.2%)	150.0
Industrial Demand (1.5%)	70.0
Total Demand	220
Imports (inc substitutes)	40
Carry In	100
Production (mmt)	230
Area (mha)	37.1
Yield (1.5%)	6.20
Carry Out	150

Corn feed demand = 150 mmt, grows at 3.2 percent/year

Corn industrial demand = 70 mmt, grows at 1.5 percent/year

Imports = 40 mmt, corn and substitutes

Carry in = 100 mmt

Area goes down 2 percent/year for 1st 5 years, then stable

Yields grow by 1.5 percent/year

U.S. GRAINS COUNCIL

Some Scenarios: Initial Conditions

Looking at the implications of the above arguments on China's long-term corn supply, demand, and trade, we can start with:

(CAGR)	*2015*
Feed Demand (3.2%)	150.0
Industrial Demand (1.5%)	70.0
Total Demand	220
Imports (inc substitutes)	40
Carry In	100
Production (mmt)	230
Area (mha)	37.1
Yield (1.5%)	6.20
Carry Out	150

Corn feed demand = 150 mmt, grows at 3.2 percent/year

Corn industrial demand = 70 mmt, grows at 1.5 percent/year

Imports = 40 mmt, corn and substitutes

Carry in = 100 mmt

Area goes down 2 percent/year for 1st 5 years, then stable

Yields grow by 1.5 percent/year

With the exception of feed demand, this is close to official S&D

U.S. GRAINS COUNCIL

Imports Restricted, First 5 Years

First 5 years: Carry out goes up then down to where it started, roughly 150 mmt

(CAGR)	2015	2016	2017	2018	2019	2020
Feed Demand (3.2%)	150.0	154.8	159.8	164.9	170.1	175.6
Industrial Demand (1.5%)	70.0	71.1	72.1	73.2	74.3	75.4
Total Demand	220	226	232	238	244	251
Imports (inc substitutes)	40	15	10	10	10	10
Carry In	100	150	168	174	172	163
Production (mmt)	230	229	228	226	225	224
Area (mha)	37.1	36.4	35.6	34.9	34.2	33.5
Yield (1.5%)	6.20	6.29	6.39	6.48	6.58	6.68
Carry Out	150	168	174	172	163	146

Next 15 Years

After that, strong import demand begins to emerge

(CAGR)	2015	2016	2017	2018	2019	2020	2025	2030	2035
Feed Demand (3.2%)	150.0	154.8	159.8	164.9	170.1	175.6	205.5	240.6	281.6
Industrial Demand (1.5%)	70.0	71.1	72.1	73.2	74.3	75.4	81.2	87.5	94.3
Total Demand	220	226	232	238	244	251	287	328	376
Imports (inc substitutes)	40	15	10	10	10	10	10	10	10
Carry In	100	150	168	174	172	163	92	-129	-473
Production (mmt)	230	229	228	226	225	224	241	260	280
Area (mha)	37.1	36.4	35.6	34.9	34.2	33.5	33.5	33.5	33.5
Yield (1.5%)	6.20	6.29	6.39	6.48	6.58	6.68	7.20	7.75	8.35
Carry Out	150	168	174	172	163	146	57	-187	-559

U.S. GRAINS COUNCIL

What if Yields Grow Faster

Yield growth of 2 percent/year would put imports off a few years, but still generates the same general outcome

(CAGR)	2015	2016	2017	2018	2019	2020	2025	2030	2035
Feed Demand (3.2%)	150.0	154.8	159.8	164.9	170.1	175.6	205.5	240.6	281.6
Industrial Demand (1.5%)	70.0	71.1	72.1	73.2	74.3	75.4	81.2	87.5	94.3
Total Demand	220	226	232	238	244	251	287	328	376
Imports (inc substitutes)	40	15	10	10	10	10	10	10	10
Carry In	100	150	169	177	179	174	103	-110	-473
Production (mmt)	230	230	230	230	230	230	253	280	309
Area (mha)	37.1	36.4	35.6	34.9	34.2	33.5	33.5	33.5	33.5
Yield (2%)	6.20	6.32	6.45	6.58	6.71	6.85	7.56	8.34	9.21
Carry Out	150	169	177	179	174	163	80	-149	-530

U.S. GRAINS COUNCIL

What if Industrial and Yields Grow Faster

Increasing industrial demand growth to 2.5 percent/year consumes the additional yield growth

(CAGR)	2015	2016	2017	2018	2019	2020	2025	2030	2035
Feed Demand (3.2%)	150.0	154.8	159.8	164.9	170.1	175.6	205.5	240.6	281.6
Industrial Demand (2.5%)	70.0	71.8	73.5	75.4	77.3	79.2	89.6	101.4	114.7
Total Demand	220	227	233	240	247	255	295	342	396
Imports (inc substitutes)	40	15	10	10	10	10	10	10	10
Carry In	100	150	168	175	174	167	59	-139	-448
Production (mmt)	230	230	230	230	230	230	253	280	309
Area (mha)	37.1	36.4	35.6	34.9	34.2	33.5	33.5	33.5	33.5
Yield (2%)	6.20	6.32	6.45	6.58	6.71	6.85	7.56	8.34	9.21
Carry Out	150	168	175	174	167	151	27	-191	-525

U.S. GRAINS COUNCIL

What if Carry In is only 50 mmt?

Some policy insiders in China claim China only needs to draw down stocks by 50 mmt

(CAGR)	2015	2016	2017	2018	2019	2020	2025	2030	2035
Feed Demand (3.2%)	150.0	154.8	159.8	164.9	170.1	175.6	205.5	240.6	281.6
Industrial Demand (2.5%)	70.0	71.8	73.5	75.4	77.3	79.2	89.6	101.4	114.7
Total Demand	220	227	233	240	247	255	295	342	396
Imports (inc substitutes)	40	15	10	10	10	10	10	10	10
Carry In	50	100	118	125	124	117	9	-189	-498
Production (mmt)	230	230	230	230	230	230	253	280	309
Area (mha)	37.1	36.4	35.6	34.9	34.2	33.5	33.5	33.5	33.5
Yield (2%)	6.20	6.32	6.45	6.58	6.71	6.85	7.56	8.34	9.21
Carry Out	100	118	125	124	117	101	-23	-241	-575

U.S. GRAINS COUNCIL

Will China Produce all These Animal Products Domestically?

Policies to address the environmental implications of large livestock operations are causing producers to build municipal waste treatment facilities, and wasting the nutrients in the manure

Many prominent policy advocates are calling for China to import animal products instead of expanding domestic production due to the environmental effects.

Corn Industrial Demand Growth Likely Greater than 1.5 Percent/Year

Industrial corn users get more policy support than the feed industry

An enforceable and expanded E10 program would not only help address air quality issues, but also boost industrial corn demand

U.S. GRAINS COUNCIL

Conclusion 1

China's consumption of animal products will continue to grow for many years

This will likely generate continued growth in soybean imports

Because corn will be used for any additional feed grain demand on top of a significant base, corn demand will grow much faster than total feed demand.

At some point the demand for corn, or other feed grain, will outstrip China's domestic production of these grains

Industrial corn demand may well grow at a substantial pace too

Conclusion 2

When demand for grain exceeds domestic production, China will either import animal products, import feed grains, or both

=> But global demand for feed grains will increase either way!

Policy preference is to import feed grains and produce animal products domestically, but several issues need to be addresses to make animal production more efficient in China

The U.S. Grains Council

- ***Developing Markets***
- ***Enabling Trade***
- ***Improving Lives***

Supporting the Modernization of China's Livestock and Feed Industries

- Establishing one of China's first modern feed mills in 1984
- Sponsoring seminars and U.S.-China technical exchanges involving hundreds of participants

Supporting China's Food Security through Trade and Information Exchanges

- Providing reliable information on U.S. production capacity, market conditions, and grain quality
- Sponsoring study and market assessment teams to the U.S. involving hundreds of participants

U.S. GRAINS COUNCIL