

# Wheat-Flour Supply Chain

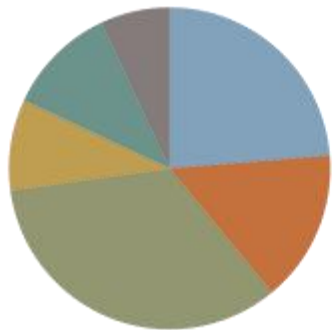


Canada-China Trade Opportunities (2018)

# Global Grain Production

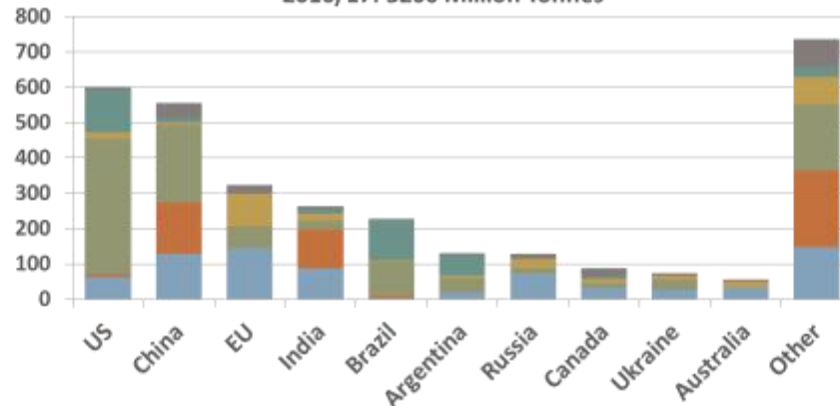
- China is the second largest grain producer in the world – 17% of global output (550 MT), behind US (600 MT) but ahead of EU, India and Brazil.
- China is the largest rice producer with 145 MT, second in wheat with 129 MT (behind EU), and also second in corn with 219 MT (behind US).
- Canada produces much less (87 MT) but is still among the world’s top-10 – 8<sup>th</sup> behind Argentina and Russia but ahead of Ukraine and Australia.
- Wheat constitutes 37% of Canada’s grain output, oilseeds (including soybean but mostly canola) 33%, coarse-grains (including corn) 25%.

Global Grain Production



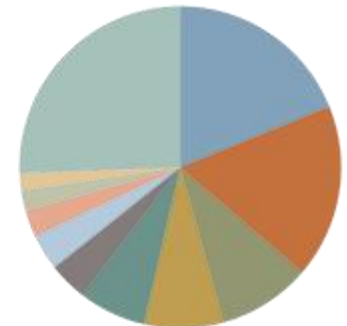
■ Wheat  
■ Corn  
■ Soybean  
■ Rice  
■ Other Coarse  
■ Other Oilseed

Major Grain Producers  
2016/17: 3200 Million Tonnes



■ Wheat  
■ Rice  
■ Corn  
■ Other Coarse  
■ Soybean  
■ Other Oilseed

Global Grain Production

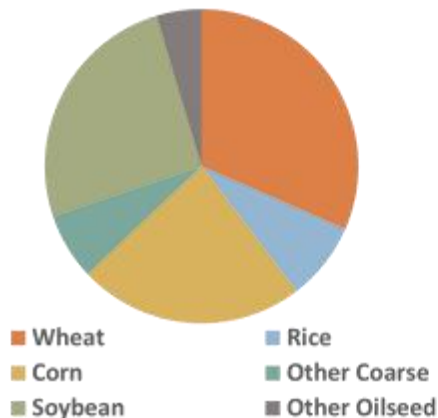


■ US  
■ China  
■ EU  
■ India  
■ Brazil  
■ Argentin  
■ Russia  
■ Ukraine  
■ Australia  
■ Other  
■ Canada

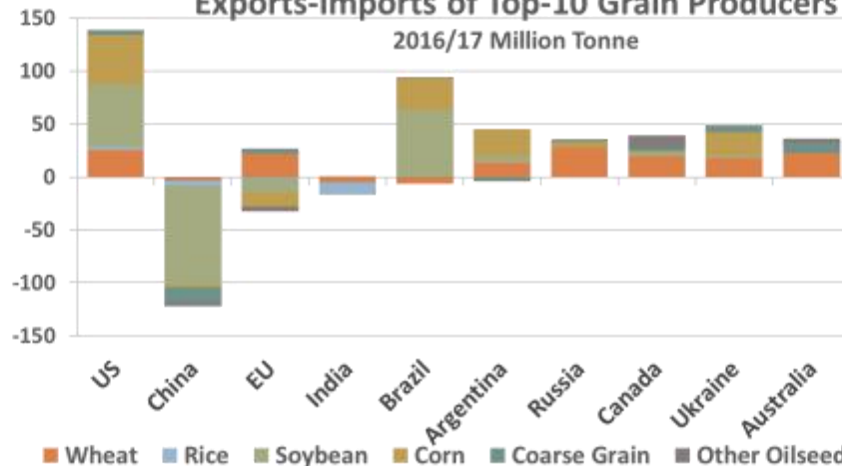
# Global Grain Trades

- Of the global grain output (3200 MT) 18% is traded (580 MT) – wheat is largest item, 183 MT, 24% of total production, 31% of all grain trades.
- Soybean is 2<sup>nd</sup> largest trade, 147 MT, but has highest trading ratio (42% of what's produced); corn comes 3<sup>rd</sup>, 141 MT (13% of what's produced).
- 7 of the top-10 producers (lead by US and Brazil) are largest exporters; EU's imports are more than its exports, while India trades very little.
- Largest importer is China, 125 MT (20% of global total) – soybean 94 MT, coarse-grains 17 MT, wheat and rice 4-5 MT each, and other oilseeds.

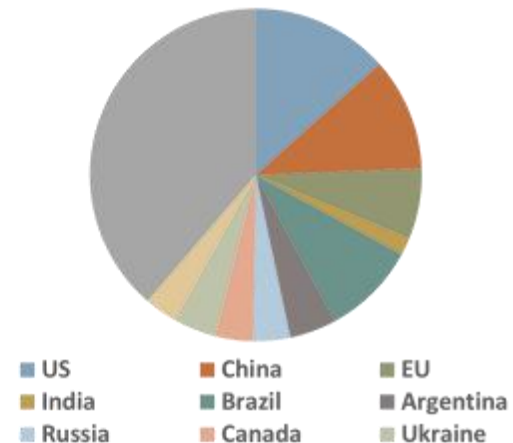
Crop Share of Grain Trades



Exports-Imports of Top-10 Grain Producers

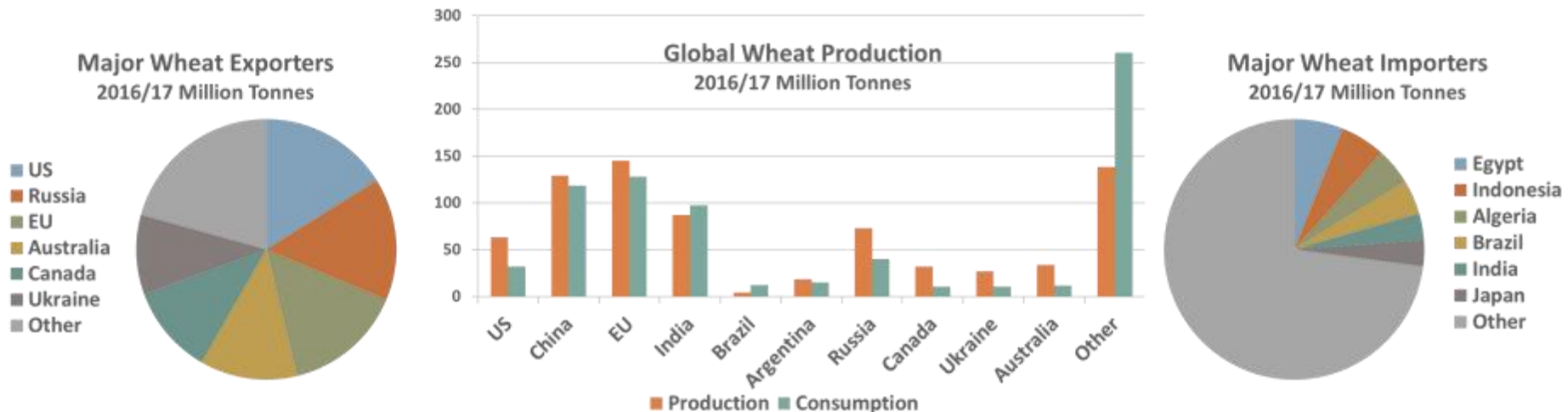


Trade Share of Top-10 Producers



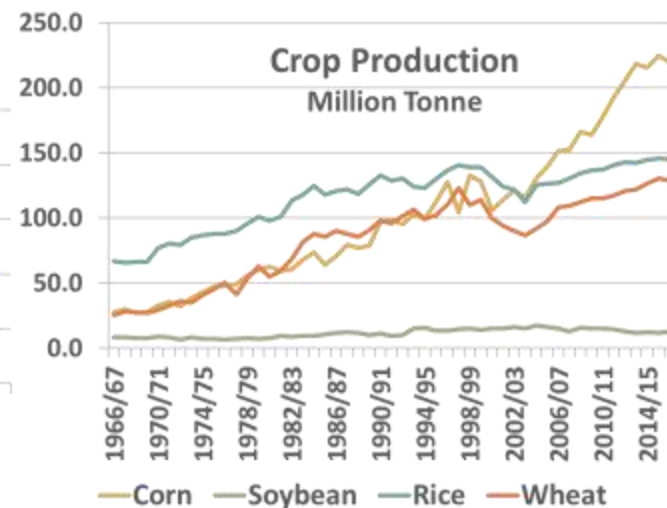
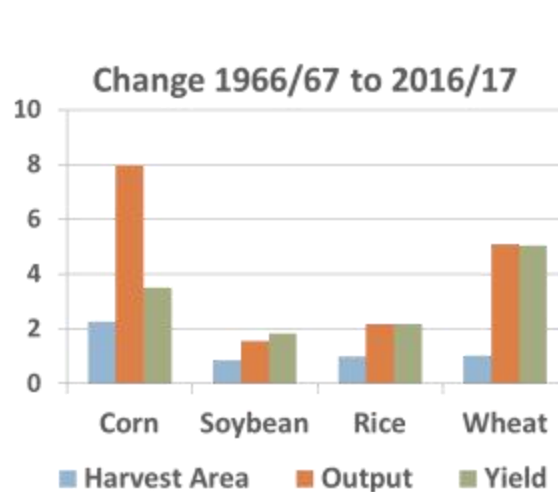
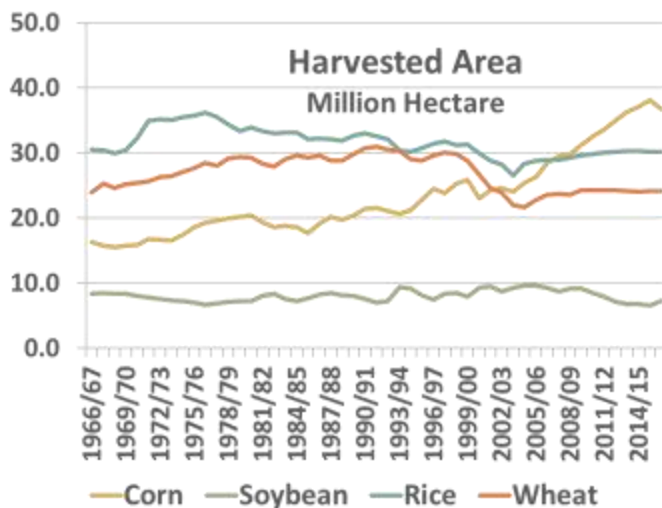
# Wheat Production and Trade

- The largest wheat exporters in the world are US (30 MT), Russia (28 MT) and EU (27 MT), each with 15-16% share of the global total (183 MT).
- They are followed by Australia (22 MT, 12%), Canada (20 MT, 11%) and Ukraine (18 MT, 10%) – remaining 38 MT (21%) spread around the world.
- Largest importers are Egypt (11 MT), Indonesia (10 MT), Algeria (8 MT), Brazil (8 MT), India (6 MT), and Japan (6 MT) – 136 MT other countries.
- China is 2<sup>nd</sup> largest producer and produces more than it consumes, but still needs to import higher grade wheat varieties – last year 4.4 MT.



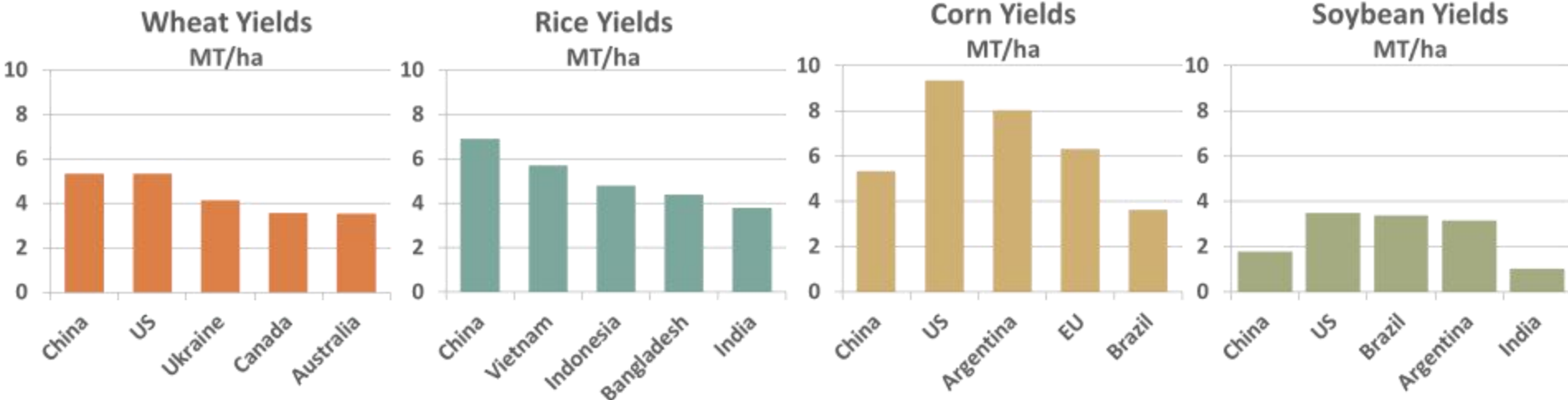
# China's Principal Crops

- Major crops China grows are wheat, rice (food staples), corn (mostly feed), soybean (feed and food) – other coarse-grains, oilseeds are minor.
- Over the Reform Era (last 50 years) crop output increased significantly: corn 8-fold, wheat 5-fold, rice doubled, soybean increased by only 50%.
- Over the same time frame, harvest area allocated for wheat and rice remained the same, soybean declined 15%, but corn increased 125%.
- Output growth came mostly from higher yields: soybean nearly doubled, rice more than doubled, wheat increased 3.5 times and corn 5-times.



# Crop Yield Increases

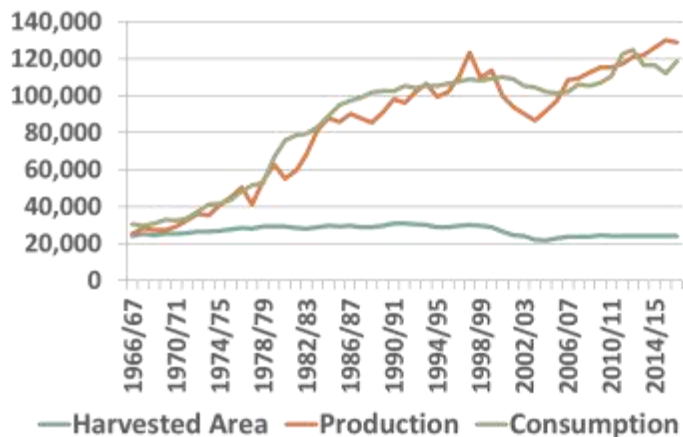
- Wheat yields are now at the same level as US, higher than Australia, Canada and Ukraine. Rice yields are above all major rice producers.
- Corn yields are below US, Argentina and EU but above Brazil. Soybean yields are generally lower, and China's average is below major producers.
- Probably true for all crops but particularly wheat yield increases have run their course – it is unrealistic to expect yet another “revolution”.
- Yields having reached a plateau, and no more land available, China can not increase production much further, necessitating more imports.



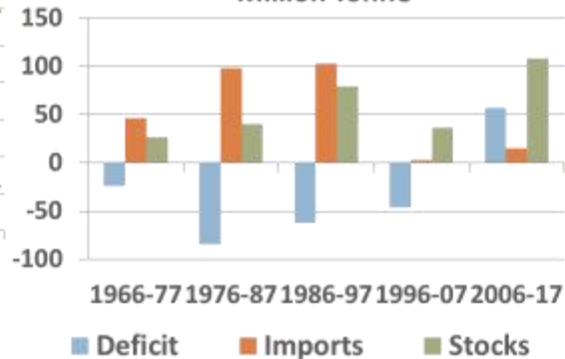
# China's Wheat Profile

- While production increases followed a similar path to consumption, there were significant shortfalls through the 1970s and into the 1990s.
- During the 1<sup>st</sup> decade of the Reform Era China imported 50 MT of wheat, doubling that during 2<sup>nd</sup> and 3<sup>rd</sup> decades – total of 250 MT in 30 years.
- Deficits continued into the 4<sup>th</sup> decade but China covered it by drawing on stocks built-up over the past 20 years – only 3 MT of imports in 10 years.
- By the 5<sup>th</sup> decade the production deficit turned into a surplus (60 MT) but 15 MT more was imported; China boosted its stocks to over 100 MT.

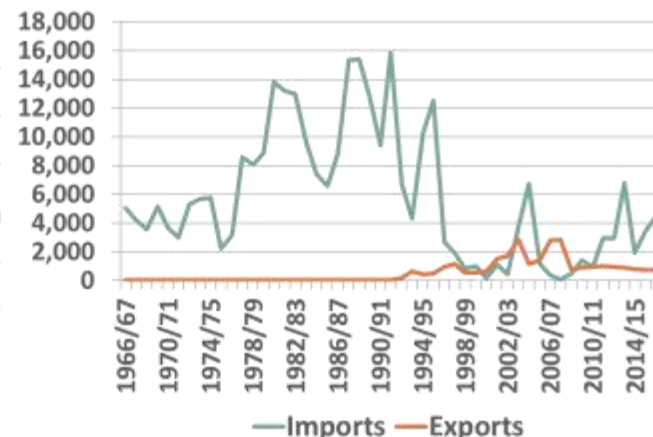
China's Wheat Profile  
(Thousand ha or 000 tonnes)



Production-Imports-Stocks  
Million Tonne

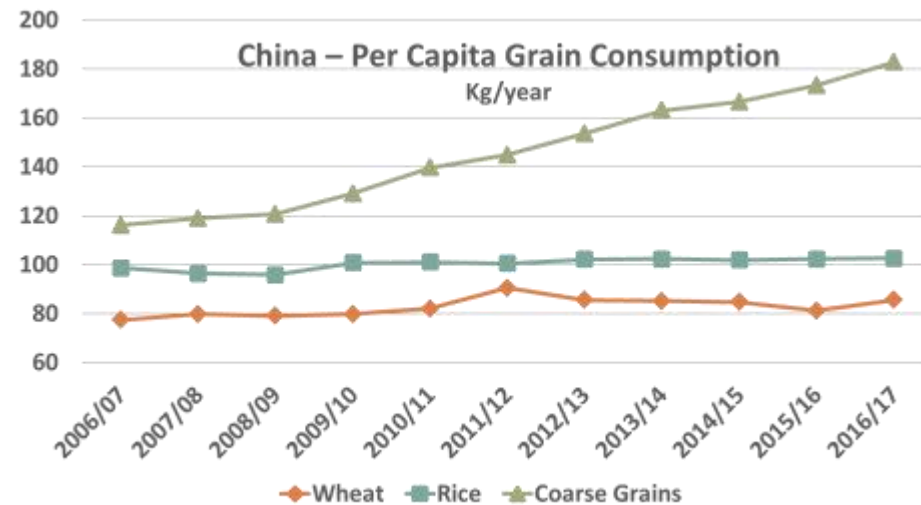
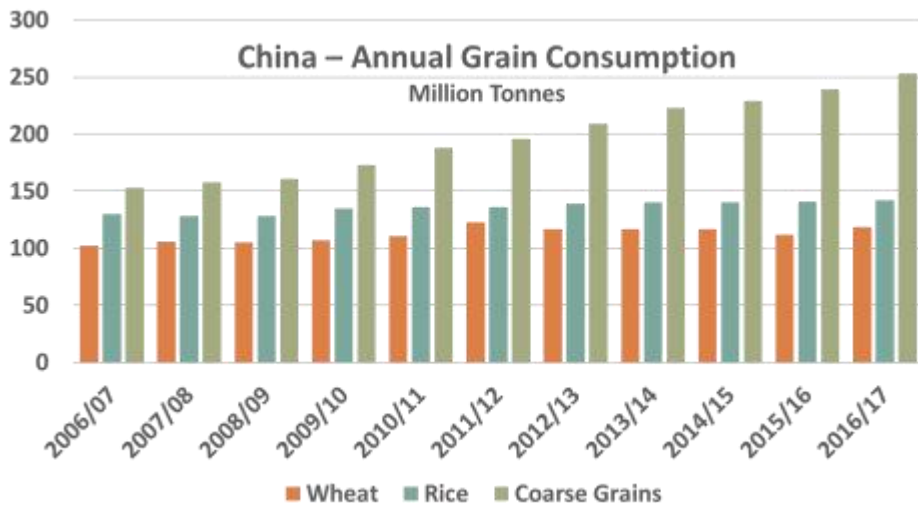


China's Wheat Trade  
(Thousand tonne)



# Consumption Trends

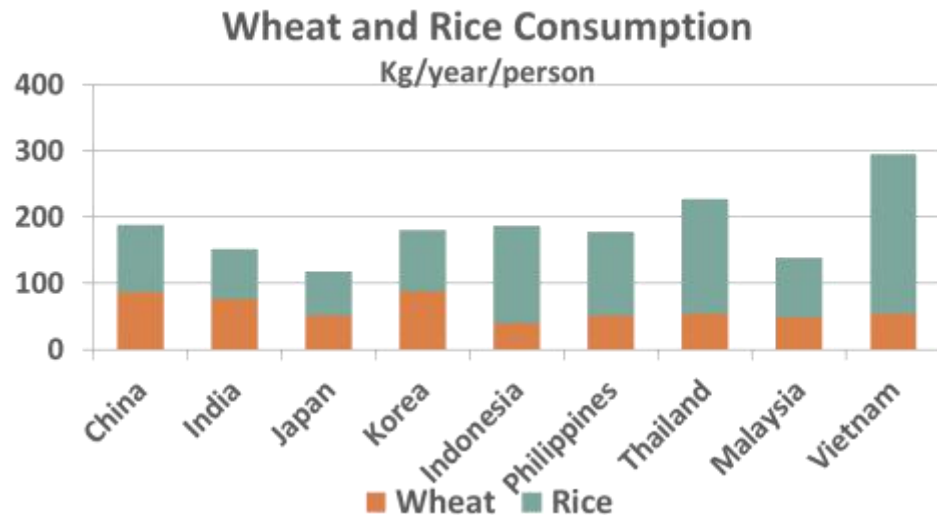
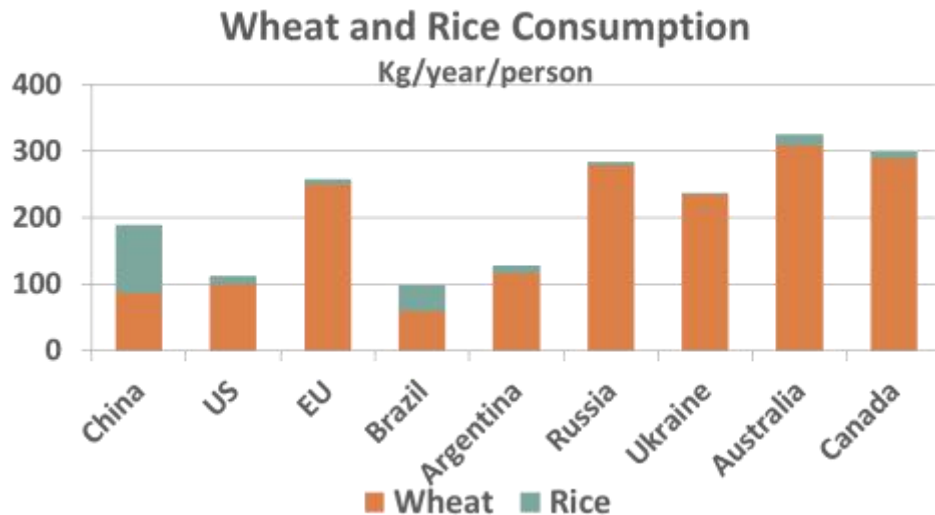
- Over the last 10 years China's annual coarse-grain consumption (mainly corn) increased by as much as two-thirds, from 150 MT to 250 MT.
- Consumption of main food-staples, wheat and rice, increased more modestly but in only 10 years still by 16% and 9%, respectively.
- In 2016/17 China consumed 119 MT of wheat and 145 MT of rice – in both cases less than what China produced but still 9 MT was imported.
- On a per capita basis consumption increases were 57% for coarse-grains, 11% for wheat and 4% for rice, but will these rising trends continue?





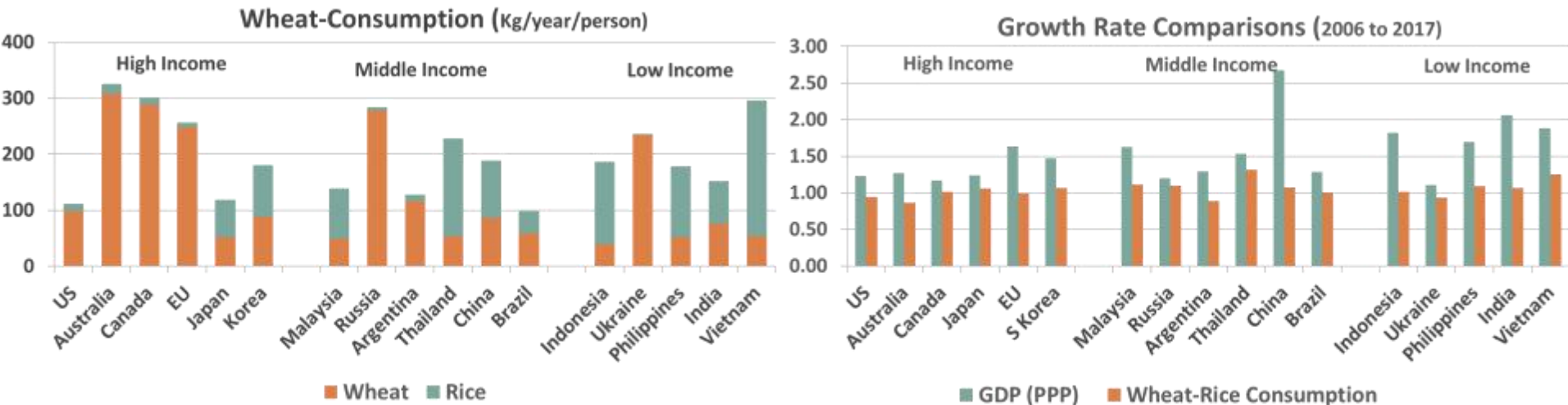
# Global Comparisons

- In the charts below we compare China's wheat-rice consumption per capita to major grain producers and select references from Asia.
- China's per capita rice consumption is lower than Indonesia, Philippines, Thailand and Vietnam but higher than Malaysia India, Japan and Korea.
- China's per capita wheat consumption is slightly below US and Argentina, comparable to Korea and India, but higher than others in Asia Pacific.
- China still consumes much less wheat per capita than others - one-third of EU and Ukraine, even less compared to Russia, Canada and Australia.



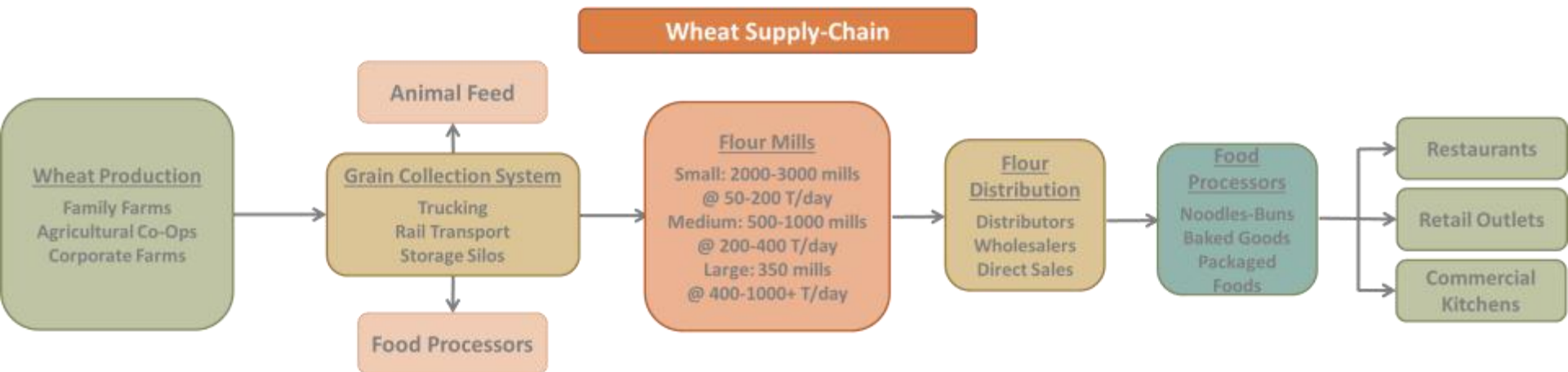
# Income Effect

- There is a misguided belief that per capita staple-crop consumption declines with increasing wealth – substitution by other calorie sources.
- There is no evidence to this effect from comparing countries at different income levels – wheat-rice consumption rises but more slowly than GDP.
- China's per capita wheat consumption at 86 kg/yr is far below Australia, Canada or Russia (280-310 kg/yr), even EU or Ukraine (230-250 kg/yr).
- In some parts of China wheat consumption is already at 250 kg/yr, but at half the world average overall consumption rate has a long way to go.



# Wheat Supply Chain

- Some of the wheat consumed in China (in total about 120 MT/yr) goes into the animal-feed-chain (~10 MT) and some to other uses (~10 MT).
- 80-85% of the wheat-supply (domestic and imported) gets grinded at flour-mills of various sizes – some small, primitive, others large, modern.
- A declining share of the flour-output is consumed directly by rural or urban households – distributed from mills or through retail-chains.
- Most wheat-flour is distributed from mills (directly or wholesale-retail) to food-processors, bakeries, restaurants or other commercial kitchens.



# Milling Industry

- Traditionally most of China's harvest used to be delivered to local mills, thousands of them (less than 100 T/day capacity) across the country.
- There are still 2000-3000 small, primitive mills with a combined annual grind capacity of 60-90 MT, but operating at very low utilization levels.
- Over the years larger mills emerged – medium-size mills (200-400 T/day), now with a combined annual capacity of 45-90 MT but still underutilized.
- Modern mills can grind 2000-5000 T/day – 350 of them already built with a combined annual capacity of 100-150 MT but still not fully utilized.



# Milling Technology

- China made huge advances in technology over the last 40-50 years – led by the global leader Buhler but also fast emerging local manufacturers.
- 1<sup>st</sup> phase focused on extraction rate improvements, but still with high ash-content and large-particles – 2<sup>nd</sup> phase focused on energy-efficiency.
- 3<sup>rd</sup> phase (2000-09) brought advances on all fronts – extraction-rate, ash-control, particle-size, energy-efficiency – and gave rise to local firms.
- Since then Chinese (manufacturers and design-build companies) have become globally dominant with new equipment and control systems.



# Leading Milling Groups

- The Chinese flour-milling industry is being modernized and consolidated in the hands of three huge milling groups – Wudeli, Yihai and COFCO.
- The largest is Wudeli, with capacity to grind more than 60,000 T/day – largest North American milling group Ardent has less than half that.
- The other two large groups, Yihai and COFCO, together have as much capacity as Wudeli – each one is as big as (if not bigger than) Ardent.
- COFCO is one of China's largest SOEs, and the largest integrated grain company in the world. Wudeli and Yihai are private milling companies.



## Wudeli Flour Group

- Private Chinese company, with 5000 employees
- 35-40 mills with 60,000 T/day grind-capacity



## Yihai Kerry

- Wilmar invested overseas Chinese enterprise
- 20-25 mills, 25,000-30,000 T/day grind-capacity



## COFCO

- State owned, Fortune 150, leading agri-business
- 20-25 mills, 20,000-25,000 T/day grind-capacity



# Industry Consolidation

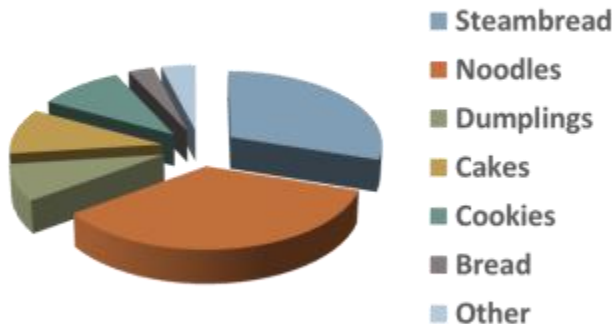
- In the last 10 years China manufactured about 100 modern milling lines a year – total of 40-50 MT capacity that could meet 50% of flour needs.
- However, smaller mills (less than 400 T/day capacity) persist, lingering with enough capacity that could meet total demand if fully utilized.
- In the coming years we expect rapid mill closures, leaving fewer than 1000 small-medium mills – still poorly utilized but with 1/3 market share.
- Large, modern and efficient mills will have 2/3 market share – in time 400 or more with enough capacity will see smaller mills disappear.



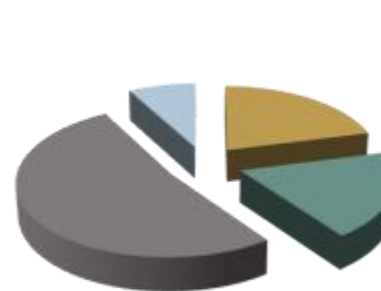
# Wheat Flour Use

- Though per capita wheat consumption in China is only slightly below the US, wheat flour use profiles of the two countries are very different.
- In the US bread accounts for more than half the flour use, while cakes and cookies for another 40% – baked foods dominate the flour demand.
- In China bread accounts for less than 5% of flour demand, cakes-cookies another 25% – steam-bread, dumplings, noodles dominate the market.
- Flour made in China is adequate for traditional food items but in many respects sub-par for baking, especially western-style breads and pastas.

Wheat Flour Use - China



Wheat Flour Use - US





# New Influences

- China's bakery industry is growing at 15-20% a year – both domestic and foreign bakery chains expanding their footprint all across the country.
- All sorts of western-style pastries are becoming popular and widely consumed, but the most significant trend is the *bread-revolution*.
- Another booming market is western-style pastas and flat-breads – pizza chains and Italian restaurants are popping up virtually in every city bloc.
- These new food trends are giving rise to higher-grade specialty flours that advanced millers are starting to focus on to satisfy market demand.



# Flour Quality

- **Advanced mills consist of multiple milling-lines which can be configured (wheat intake, process, product attributes) to produce specialty flours.**
- **Technology brings huge advantages, not just higher extraction rates and fuel efficiency but also cleaning, blending and purification capabilities.**
- **Automated mills can control (for each milling-line) the wheat-mix best suited for the intended flour-use as well ash-content and particle-size.**
- **Also, knowhow, technology and equipment are there for new boutique mills to start-up, focusing on high-quality product-lines for specific uses.**

## Process Improvement

Auto cleaning, blending

Auto feeding rollermills

Mono-case plansifters

Enhanced purification



## Quality Achievements

Roller chill length increase

Purifying width increase

Shifting surface increase

Flour extraction, ash control

# Wheat Input

- The challenge in diversifying into high-quality specialty flours is the wheat intake – desired protein content, hardness, milling grade, etc.
- In tandem with the *production-drive* to increase yields, China also embarked on a *quality-drive* to improve the grades of wheat it produced.
- Farming methods were improved (mechanization through investment) as well as seed quality (cross-breeding foreign seeds with local ones).
- Improvements are impressive, but China still needs imported wheat varieties to blend with local ones to achieve the desired flour attributes.

## Local Grades

**Seed Quality**  
Cross-breeding, set standards

**Improved Harvesting**  
Mechanization, methods

**Desired Attributes**  
Protein, stability, extensibility



## Import Blends

**Hard Red**  
Western-style bread varieties

**Soft White**  
Cakes-cookies, baked goods

**Durum**  
Emerging pasta, quality noodles

# Export Prospects

- Under pressure to improve wheat quality and facing severe land-water constraints, we believe China is going to revert back to importing more.
- More recently wheat imports have been 4-5 MT/yr but 25-30 years ago they had peaked at 10-15 MT/yr, back then driven by food-necessity.
- Today's realities are different; driven by grade-quality and resource-constraints, we expect wheat imports to go back to 10 MT or more.
- Western Canadian wheat varieties – hard-red, soft-white and durum – are ideally positioned to meet China's new flour input requirements.

