This report is based on forecasts completed at the end of March, and hence does not reflect the further deterioration of economic conditions since then due to the spread of the coronavirus pandemic and significant restrictions on economic activity in many large economies. We will be publishing updated forecasts to the industry databank at the start of May 2020.
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- Page 3 - Global summary
- Page 4 - US agricultural machinery outlook
- Page 5 - High-frequency tracking indicators
- Page 6 - Key drivers of sectoral demand
- Page 7 - Key buyers of agricultural machinery
- Page 8 - Trade outlook
- Page 9 - Global macroeconomic risks

<table>
<thead>
<tr>
<th>Sector NAICS codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry and fishing</td>
</tr>
<tr>
<td>Agricultural machinery</td>
</tr>
<tr>
<td>Farm machinery</td>
</tr>
<tr>
<td>Lawn and garden equipment</td>
</tr>
</tbody>
</table>

Note: Unless specified, all forecasts represent our baseline view
Forecast highlights

Coronavirus-led uncertainty weighs on investment decisions this year

- Since our forecast was compiled at the end of March, conditions have deteriorated further, especially in the US. Therefore, we now expect the outlook in agriculture and related machinery markets will be weaker than shown by the baseline in this report. Growth is instead more likely to be closer to, or even worse than, the pandemic scenario presented on page 9.

- US agricultural machinery value-added output contracts -4.3% in 2020 in our baseline forecast, before rebounding 6.5% in 2021. There is a lot of uncertainty stemming from the sources of demand for food, and on what products to focus production, therefore the equipment needed. This is in addition to existing uncertainty over whether China will comply with the agreed purchases of US agricultural goods from the phase one trade agreement.

- Global output is set to fare worse than seen in the US, with emerging markets, led by China, having output decline -30.5% in 2020. The global environment is changing rapidly as economies race to put in measures to stem the outbreak, ranging from lockdowns to social distancing measures.

- The weak start globally to 2020 is worse in China given the earlier timeline therefore of the coronavirus, weighing on already weak tractor sales, extending the double digit decline in agricultural machinery for another year, also weighing heavily on output from regional trading partners.

- As the outbreak has moved to the west, the weakness in global growth is extended into Q2, largely driven by the US, Brazil and Europe. It is largely an export story in Brazil, as demand from China dropped off in Q1 but as the virus spread, there are supply side constraints on Brazil’s side now. In the US, we expect that farmers moves to adapt their farm use will not require additional output of equipment, given existing inventories.

- Amidst the negativity, we continue to consider an upside scenario whereby there is a sooner-than-expected recovery in the emerging markets as trade war fears and impacts of coronavirus begin to fade. This would help boost certainty for US producers in light of the phase one trade agreement.

Growth drivers/constraints

- Heightened uncertainty – despite a ‘phase-one’ deal between the US and China and the new USMCA, the coronavirus has notably heightened uncertainty affecting both the supply and demand side of agriculture.

- Rising population and urbanization – this will lead to greater demand and variety for and consumption of foodstuffs as well as commodities which go into them such as grains.

- Farm robotics - the rising utilisation of these types of machinery should support farm income and demand for agricultural machinery in the medium to long-term as major players in the industry continue to invest in new technology.
Overview

- In our March 2020 US baseline forecast, output of agricultural machinery is set to contract this year. Uncertainty over demand is a key factor limiting capital expenditure of farm and lawn & garden equipment, along with difficulties operating manufacturing within the government restrictions for slowing the spread of the coronavirus.

- As the outbreak has spread there are concerns over the longevity of its impact. This could see farmers who have flexibility in land use to focus on produce that has a relatively short growing period.

- The planting season is underway in the US, so most farmers likely have their required machinery. There may be some who reconsider the volume and type of produce to grow, which could spur some demand for different machinery. But given relatively healthy levels of farm machinery inventories, it’s likely that any additional demand will not require more production from manufacturers.

- Despite reduced orders from food establishments, there is expected to be supply side issues affecting farm income, particularly those growing fruit and vegetables.

- Lawn and garden equipment are set to struggle this year. The outlook was already weak prior to the virus outbreak. Also sales are hampered by closures of some hardware outlets.

Global drivers/constraints

✓ Solid long-term population growth - increasing demand for food and agricultural products.

✓ Greater utilisation of technology in farms - to improve efficiency and profit margins giving greater potential for capex.

✗ Heightened uncertainty - existing uncertainty over the compliance in the phase one agreement. But the coronavirus outbreak has notably added to this as farmers are concern over future demand and income affecting capex decisions.
• Capacity utilization - if this rises to a high level, e.g. above historical average level, then cost pressures rise. Also, if demand rises further then additional capital expenditures are more likely to be needed.

• Prices received by farmers - Higher commodity prices improve revenues and financial ability to invest in new machinery for either expansion purposes or to replace inefficient models.

• Machinery prices - higher output/product prices result in greater revenue for the machinery producers.

• Climate conditions - a sharp increase/decrease in temperature or rainfall can affect harvest cycles, potentially reducing demand for machinery or reducing ability to invest.

• Consumer spending - demand for food products typically sold in grocery stores can inform farmers and next season’s harvest, determining the types of machinery required.

• Farmland prices - higher prices for renting farmland reduces the profit margin for farmers who rent, but improves the balance sheet of the landowners.

If you have any questions, please send them to cparkins@oxfordeconomics.com and they will be addressed in the next webinar.
Key drivers of sectoral demand

<table>
<thead>
<tr>
<th>Core component</th>
<th>NAICS code</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm machinery and equipment</td>
<td>333111</td>
<td>Bale throwers, hog feeding and watering equipment, hulling machinery, irrigation equipment and plows.</td>
</tr>
<tr>
<td>Lawn and garden equipment</td>
<td>333112</td>
<td>Snowblowers and throwers, hedge trimmers, grass mowing equipment, seeders, mulchers.</td>
</tr>
</tbody>
</table>

**Key macro drivers**

- Agricultural machinery output demand is primarily driven by investment spending in capital intensive industries such as agriculture, but also to a lesser extent by business services such as building management and related support services, also the wholesale distribution network and equipment leasing companies.

  - Demand is cyclical, reflecting the volatility of business investment (one of the most volatile components of GDP), also the impact of credit conditions.

  - Demand for agricultural machinery closely tracks the profitability enjoyed by agriculture producers. This is affected by the prices received by farmers for a range of commodities as well as the cost of energy and land maintenance.

  - Farm machinery and equipment is also relatively trade-intensive, in contrast to lawn and garden equipment which is primarily sold to a domestic market. Thus, demand for farm machinery and equipment is typically strongly correlated with exports, highlighting the importance of exchange rates in determining competitiveness.
Overview

- The total level of output produced by farm machinery and lawn & garden equipment manufacturers was US$34.4 billion in 2017.
- The slate of demand for farm machinery consists of exports, imports, stockbuilding, purchases of agricultural machinery as operating inputs and supplies (OpEx) and purchase of agricultural machinery as investment spending (CapEx).
- In 2017, the demand composition for total agricultural machinery consisted of:
  - **Exports**: $13,269mn
  - **Imports**: $11,141mn
  - **Investment (CapEx)**: $29.3bn
  - **Purchases of inputs and supplies (OpEx)**: $5.8bn

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### Share of OpEx of farm machinery and equipment from industries (2017)

- **Share of OpEx on Farm machinery and equipment**
  - Agriculture, forestry, fishing, and hunting: 2%
  - Personal & household goods repair: 5%
  - Administrative & support services: 6%
  - Other: 6%
  - Source: Oxford Economics/BEA

### Share of OpEx of lawn and garden equipment from industries (2017)

- **Share of OpEx on Lawn and garden equipment**
  - Rental & leasing services: 6%
  - Agriculture, forestry, fishing, and hunting: 5%
  - Personal & household goods repair: 4%
  - Administrative & support services: 3%
  - Source: Oxford Economics/BEA

### US: Real gross output for “OpEx buyers” of farm machinery and lawn & garden equipment

- **Annual % change (unless specified)**
- **NAICS Code**
- **2018 level**
- **2018**
- **2019**
- **2020**
- **2021**
- **2022-2026**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Wholesale trade</td>
<td>42</td>
<td>1890.6</td>
<td>-3.3</td>
<td>0.2</td>
<td>-1.4</td>
<td>4.9</td>
<td>1.7</td>
</tr>
<tr>
<td>State &amp; local gov. services</td>
<td>GSLGO, GSLGE</td>
<td>1828.9</td>
<td>1.1</td>
<td>1.3</td>
<td>0.7</td>
<td>0.4</td>
<td>0.5</td>
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<td>Other retail</td>
<td>442-3, 446-8, 451, 453-4</td>
<td>973.2</td>
<td>4.3</td>
<td>3.8</td>
<td>-0.3</td>
<td>4.6</td>
<td>2.2</td>
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<tr>
<td>Admin and support services</td>
<td>561</td>
<td>897.9</td>
<td>6.5</td>
<td>2.0</td>
<td>1.4</td>
<td>4.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Agriculture, forestry, fishing &amp; hunting</td>
<td>11</td>
<td>527.0</td>
<td>-0.5</td>
<td>1.1</td>
<td>-1.2</td>
<td>3.8</td>
<td>1.9</td>
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<tr>
<td>Rental and leasing services</td>
<td>532, 533</td>
<td>327.4</td>
<td>1.0</td>
<td>2.4</td>
<td>0.6</td>
<td>3.4</td>
<td>1.6</td>
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<tr>
<td>State &amp; local gov. healthcare facilities</td>
<td>GSLGH</td>
<td>308.6</td>
<td>2.9</td>
<td>2.0</td>
<td>1.5</td>
<td>1.0</td>
<td>0.9</td>
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<tr>
<td>Scientific research &amp; development</td>
<td>5417</td>
<td>229.2</td>
<td>2.6</td>
<td>3.5</td>
<td>-1.6</td>
<td>4.6</td>
<td>1.5</td>
</tr>
<tr>
<td>Waste management and remediation</td>
<td>562</td>
<td>91.8</td>
<td>1.1</td>
<td>2.8</td>
<td>-3.0</td>
<td>3.5</td>
<td>1.1</td>
</tr>
<tr>
<td>Personal &amp; household goods repair</td>
<td>8114</td>
<td>19.1</td>
<td>-2.1</td>
<td>-7.1</td>
<td>-6.8</td>
<td>4.4</td>
<td>2.0</td>
</tr>
</tbody>
</table>

*Levels in US$bns, real inflation-adjusted 2012 prices

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### US: Real gross output for “CapEx buyers” of agricultural machinery

- **Annual % change (unless specified)**
- **NAICS Code**
- **2018 level***
- **2018**
- **2019**
- **2020**
- **2021**
- **2022-2026**

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</tr>
</thead>
<tbody>
<tr>
<td>Wholesale trade</td>
<td>42</td>
<td>1639.6</td>
<td>-0.2</td>
<td>0.4</td>
<td>4.9</td>
<td>1.7</td>
<td></td>
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<tr>
<td>Food, beverage &amp; tobacco products</td>
<td>311, 312</td>
<td>963.1</td>
<td>0.9</td>
<td>0.5</td>
<td>-0.2</td>
<td>5.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Admin and support services</td>
<td>561</td>
<td>843.2</td>
<td>6.5</td>
<td>2.0</td>
<td>1.4</td>
<td>4.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Agriculture, forestry, fishing &amp; hunting</td>
<td>111</td>
<td>529.6</td>
<td>-0.5</td>
<td>1.1</td>
<td>-1.2</td>
<td>3.8</td>
<td>1.9</td>
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<td>532, 533</td>
<td>324.3</td>
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<td>0.6</td>
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<td>1.6</td>
<td></td>
</tr>
</tbody>
</table>

*Levels in US$bns, real inflation-adjusted 2012 prices

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**Contact:** Chloe Parkins | Economist | cparkins@oxfordeconomics.com
Outlook

• The US produced an estimated $41.5bn worth of agricultural machinery in 2019 and exported about a quarter of this to other countries. The majority of the exports were sent to Canada, Mexico and Brazil.

• Demand for agricultural machinery from Canada is still set to improve upon last year’s performance but remain limited as a result of the coronavirus outbreak. There are a lot of initiatives set out by Agriculture Canada for this year which should boost farm output and following this income and demand for farm machinery. This is to be supported by continued favorable financing conditions and low interest rates, making additional capex more inclusive to both small and larger farms.

• Despite renewed confidence stemming from the USMCA agreement, export demand from Mexico is set to drop in 2020. Since the coronavirus outbreak, food markets such as fruit have seen a notable drop in export demand from key trading partners such as the US and Canada. With less demand for produce, there will be less need to expand capacity as utilisation will still be with normal levels.

• The outlook for Australian demand has weakened even further as investment by the agriculture sector is set for a double-digit contraction this year with output growth also in negative territory. Together these suggest that there are little capacity constraints at the current volume of output, limiting demand for agricultural machinery. The agriculture sector has been classed as an essential service in the coronavirus pandemic, however, there are concerns that travel disruptions may lead to a shortage in laborers that are typically important in the harvest season later in the year.
## Global macroeconomic risks

<table>
<thead>
<tr>
<th>Scenario and assumptions</th>
<th>Probability</th>
<th>Impact on growth*</th>
<th>Transmission</th>
<th>Impact on agricultural machinery</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coronavirus pandemic</strong> - impact on labour supply, expenditure and financial markets occurs in the first six months. Production, tourism, discretionary spending and investment are set to weaken further.</td>
<td>N/A - special scenario</td>
<td>Baseline: 2020: -4.3%, 2021: 6.5% Scenario: 2020: -6.5%, 2021: 4.3%</td>
<td>Production levels in key industries drop, supply and demand disruptions occur and capital expenditure plans get scaled back of postponed.</td>
<td>The fall in discretionary consumer spending, service sector closures and food demand from tourism will weigh on farm income, more for those who focus on higher-value produce. The overall slowdown in income with heightened uncertainty will postpone investment decisions in the short term.</td>
</tr>
<tr>
<td><strong>EM growth falters</strong> - the slowdown takes hold as confidence worsens in coronavirus-hit China and related economies, at the same time as structural deficiencies hinder productivity gains in vulnerable EM markets.</td>
<td>10%**</td>
<td>Baseline: 2020: -4.3%, 2021: 6.5% Scenario: 2020: -6.5%, 2021: 4.3%</td>
<td>Investment decisions are postponed on the back of weaker confidence and weaker Chinese demand reduces import demand from trading partners.</td>
<td>The slowdown in China is bigger than anticipated, which will likely lead to less demand for US agricultural goods such as soybeans. Weaker demand from the region will weigh on farm income and capex in the short term until conditions show signs of improving.</td>
</tr>
<tr>
<td><strong>Global recession</strong> - further weakness in industry spills over to services against a backdrop of coronavirus-related disruption, falling confidence, deteriorating labour market conditions and marked commodity and asset price falls.</td>
<td>25%**</td>
<td>Baseline: 2020: -4.3%, 2021: 6.5% Scenario: 2020: -6.1%, 2021: 2%</td>
<td>Weaker confidence weighs on capex and as sentiment deteriorates, borrowing rates become higher. A stronger dollar makes US exports less competitive relative to Europe.</td>
<td>A global recession would cause a widespread decrease in demand for food and other agricultural products. Weaker demand will decrease farm income, this along with higher borrowing costs will reduce demand for agricultural machinery.</td>
</tr>
<tr>
<td><strong>Global trade war</strong> - the apparent improvement in trade relations proves fleeting, President Trump implements major new trade policy measures against China, Mexico and other trading partners.</td>
<td>5%**</td>
<td>Baseline: 2020: -4.3%, 2021: 6.5% Scenario: 2020: -5.8%, 2021: 3.7%</td>
<td>Higher tariffs directly hit exports and investment expenditure. A fall in confidence weighs on investment decisions and a stronger dollar weighs on US competitiveness.</td>
<td>Countries affected by tariffs see a fall in overall demand and consumer spending. This is compounded by falling global commodity prices which will weigh further on farm income, a key driver of agricultural machinery.</td>
</tr>
<tr>
<td><strong>Weaker corporate profits tips US into recession</strong> - the late-cycle US economy weakens markedly against the backdrop of falling corporate profits, falling confidence and substantial asset price falls.</td>
<td>20%**</td>
<td>Baseline: 2020: -4.3%, 2021: 6.5% Scenario: 2020: -5.4%, 2021: 4.2%</td>
<td>Corporate profits fall further as weaker business confidence exacerbates the slowdown in demand. Higher risk premia raises the cost of credit-driven capex.</td>
<td>The combination of weaker demand and corporate profits see output in the agriculture sector falling below baseline. This will reduce demand for farm machinery, especially in areas associated with discretionary spending as precautionary savings rise.</td>
</tr>
<tr>
<td><strong>EM upturn as trade war fears fade</strong> - EM's benefit from a further loosening of policy in China, swift roll-back of past tariff hikes and a supportive monetary policy among advanced economies.</td>
<td>15%**</td>
<td>Baseline: 2020: -4.3%, 2021: 6.5% Scenario: 2020: -3.4%, 2021: 8.4%</td>
<td>Lower tariffs directly boost exports and investment expenditure by lowering the price of imported capital goods and raising the return on investment.</td>
<td>Stronger economic growth will lead to an increase in demand for food, which will support stronger farm income and profits, increasing the ability and need for farm machinery. As household confidence rises, demand for lawn and garden equipment should strengthen.</td>
</tr>
</tbody>
</table>

*Annual growth rates for baseline and scenario represent inflation adjusted value-added output for the US

**Weights will be updated to fully account for the coronavirus pandemic in Q2

If you’d like to discuss a more bespoke forecast specific to your organization please contact: nickstavropoulos@oxfordeconomics.com

Page 9 Contact: Chloe Parkins | Economist | cparkins@oxfordeconomics.com