Agriculture has been historically one of the main sectors of the Ukrainian economy. Considered for centuries as a “bread basket of Europe” Ukraine today possesses arable land area which equals to 30% of arable land of the European Union and 2.1% of the global arable land bank. But it has always been about quality, not quantity: Ukraine accounts for about 25% of the world most fertile black soil which makes our country unique in terms of agri potential.

It is only natural that Ukraine became world largest sunflower oil exporter, second largest grain exporter, forth corn and barley, sixth wheat and soybean and seventh poultry and honey exporter, and ninth largest egg producer. At the same time there is still a large room for growth. Government policies, foreign investments and technologies are further improving yields and stimulating the development of food processing making Ukrainian agricultural sector even more profitable.

Liberalization of agricultural land market in Ukraine in the nearest future will stimulate growth of investment in further agricultural sector development, leading Ukraine to the top of the global food security system.

The National Investment Council was established by the President of Ukraine to facilitate public-private dialog with key business leader on investment promotion, boosting FDI and tackling key obstacles of Ukrainian regulatory environment.

The Office of the National Investment Council is a non-government organization, supported by the European Bank for Reconstruction and Development, which serves as a platform for public-private dialogue bringing together representatives of the business community, IFIs and Ukrainian officials.

The Office of the National Investment Council provides analytical coverage of the key sectors of Ukrainian economy, with high investment potential, key regulation and issues related to investment in these sectors.

We are focusing on practical steps needed to address investors’ needs and concerns, enhancing public private dialogue and promoting actions to strengthen business climate in the country.

Our goal is to maintain a dialogue between foreign institutional and private investors, IFIs and the Government to promote Ukraine as an investment destination and to facilitate development and implementation of legislation to improve business climate and increase FDIs.
SECTION 1 – Ukrainian agri sector overview

1.1. Macroeconomic overview
   1.1.1. Agri sector in Ukrainian economy
   1.1.2. Key agricultural products
   1.1.3. Foreign trade of agricultural products: structure and destinations

1.2. Resource base and agricultural production inputs
1.3. Logistics
1.4. Storage and shipping
1.5. Legal and regulatory framework
1.6. Key agricultural companies in Ukraine

SECTION 2 – Key agricultural markets in Ukraine

2.1. Crops market
2.2. Meat market
2.3. Dairy products market

SECTION 3 – Global trends and opportunities for Ukrainian agricultural sector

3.1. Key trends in global agriculture in 2017-2026
3.2. Opportunities for Ukrainian agricultural sector
3.3. AgriTech – increasing productivity in agriculture through innovation

SECTION 4 – Further sectoral reforms to improve business climate
Ukrainian Agri Sector Overview
Macroeconomic overview

Agricultural sector becomes a locomotive of Ukrainian economy

Over the last decade, agricultural sector has moved to the forefront of Ukrainian economy. Over the last 3 years agricultural sector contributed 10-12% of Ukrainian GDP (nominal), being among TOP-3 largest industries. Approximately 17% of working population is employed in agriculture.

In 2017, nominal agricultural GDP stands at USD 11.5 bn compared to USD 10.8 bn in 2016 (+6%)\(^1\).

Top-5 industries contributing to GDP (nominal)\(^2\)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesale and retail trade</td>
<td>14.4%</td>
<td>14.9%</td>
<td>14.3%</td>
<td>14.5%</td>
<td>14.7%</td>
<td>13.8%</td>
<td>13.9%</td>
<td>14.1%</td>
</tr>
<tr>
<td>Processing industry</td>
<td>13.2%</td>
<td>11.9%</td>
<td>12.4%</td>
<td>11.3%</td>
<td>12.2%</td>
<td>11.9%</td>
<td>12.0%</td>
<td>12.4%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>7.4%</td>
<td>8.2%</td>
<td>7.8%</td>
<td>8.8%</td>
<td>10.2%</td>
<td>12.1%</td>
<td>11.6%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Transportation, warehousing and post</td>
<td>7.7%</td>
<td>7.9%</td>
<td>7.0%</td>
<td>7.1%</td>
<td>6.4%</td>
<td>6.8%</td>
<td>6.6%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Mining industry</td>
<td>5.9%</td>
<td>6.5%</td>
<td>5.8%</td>
<td>5.5%</td>
<td>5.0%</td>
<td>4.8%</td>
<td>5.4%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>

Source: Ukrstat

Importance of agriculture to Ukrainian economy becomes more visible in the context of foreign trade. Over 2010-2017, share of agricultural products in total export increased – from 21% in 2010 to 44% in 2017, while share of agricultural products in total imports fluctuated around 10%\(^3\).

Agricultural exports have been the largest export category since 2013. In 2017, its share was almost 2x larger than that of the 2nd largest export category (ferrous and nonferrous metals).

Ukrainian exports by industry

Score: % of total exports

![Ukrainian exports by industry graph]

Source: Ukrstat

---

1. Source: Ukrstat
2. Top-5 industries as of results for the last full year (2017)
3. Source: National Bank of Ukraine
In dollar terms, in 2017, agricultural exports and imports continued to grow, demonstrating 16% and 10% growth, respectively. Net positive balance from foreign trade with agricultural goods reached USD 13.5 billion, beating its previous record set in 2016 by more than USD 2 billion.

Agricultural sector is a major source of foreign currency inflow to Ukraine. In 2017, agricultural exports generated 28% of foreign currency inflows.

Production

Crop farming is a basis of agriculture in Ukraine, most notably – production of grains and vegetable oil. In 2017, crops farming accounted for 72% of agricultural output (in USD terms), animal farming accounted for the remaining 28%.

Besides crops, Ukraine specializes in production of sugar, poultry and eggs. Production of these items, which exceeds home demand, is focused on export.

For detailed overview of key subsectors please see Section 2 of this report.

Agricultural exports from Ukraine are relatively concentrated. So far Ukraine specializes in export of commodities. In 2017, 3 largest categories – grains, fats & oils and oilseeds – jointly accounted for 74% of total agricultural exports. Also, Ukraine increased the supplies of processed and food products: butter – up USD 92.2 mln, flour products and groats – up USD 48.8 mln.
In terms of destinations, Asia, EU and Africa dominate the export flows, jointly accounting for 89% of exports. In 2017, India, the Netherlands, Egypt, Spain and China became the TOP-5 countries-leaders who purchased Ukrainian agricultural and food products at more than USD 1 bln.

Ukraine is one of the leading exporters of agricultural products in the world:

- in sunflower oil
- in corn
- in barley
- in wheat
- in soybean

**Export of agricultural products**

<table>
<thead>
<tr>
<th>Score: USD m</th>
<th>Period: 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.8 bn</td>
<td></td>
</tr>
</tbody>
</table>

**Dynamics of export of agricultural products from Ukraine by destination**

<table>
<thead>
<tr>
<th>Score: % of total</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>33%</td>
<td>20%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>10%</td>
<td>8%</td>
<td>7.6%</td>
</tr>
<tr>
<td>EU-28</td>
<td>32%</td>
<td>32%</td>
<td>36%</td>
<td>41%</td>
<td>47%</td>
<td>48%</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>9.9</td>
<td>12.8</td>
<td>17.9</td>
<td>17.0</td>
<td>16.7</td>
<td>14.5</td>
<td>15.3</td>
<td>17.8</td>
</tr>
<tr>
<td>CIS</td>
<td>25%</td>
<td>28%</td>
<td>34%</td>
<td>36%</td>
<td>41%</td>
<td>47%</td>
<td>48%</td>
<td>45%</td>
</tr>
<tr>
<td>Other regions</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Source: UCAB
Agricultural imports to Ukraine are more diversified than exports, dominated by food products and ingredients. In 2017, 5 largest categories – fish, fruit & nuts, tobacco, alcoholic & non-alcoholic beverages and oilseeds products – jointly accounted for 48% of total agricultural imports.

Almost half of imports come from EU (46%), a quarter (23%) – from Asia, the remaining third (31%) – from the rest of the world.
Resource base and agricultural production inputs

Ukraine has favourable climate for large-scale agriculture, rich agricultural soils and access to abundant land and water resources.

**Ukraine possesses 32.5 m ha of arable land**

Ukraine has 42.2 m ha of agricultural land comprising 70% of the country’s total area. Out of those, 32.5 m ha is arable land (76% of agricultural land), 5.4 m ha is pastures (13%), 2.4 m ha is grasslands (6%), 0.9 m ha is perennial plantings (2%).

Ukrainian arable land area equals 30% of that of European Union and 2.1% of the world’s total arable land area.

### Agricultural land in the countries—large agricultural producers

<table>
<thead>
<tr>
<th>Area</th>
<th>Agricultural area</th>
<th>Arable land</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>180</td>
<td>156</td>
</tr>
<tr>
<td>USA</td>
<td>406</td>
<td>152</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>218</td>
<td>123</td>
</tr>
<tr>
<td>China</td>
<td>529</td>
<td>120</td>
</tr>
<tr>
<td>EU</td>
<td>185</td>
<td>107</td>
</tr>
<tr>
<td>Brazil</td>
<td>283</td>
<td>80</td>
</tr>
<tr>
<td>Australia</td>
<td>366</td>
<td>46</td>
</tr>
<tr>
<td>Canada</td>
<td>63</td>
<td>44</td>
</tr>
<tr>
<td>Argentina</td>
<td>149</td>
<td>39</td>
</tr>
<tr>
<td>Ukraine</td>
<td>42</td>
<td>33</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>217</td>
<td>29</td>
</tr>
<tr>
<td>France</td>
<td>29</td>
<td>18</td>
</tr>
<tr>
<td>Spain</td>
<td>26</td>
<td>12</td>
</tr>
<tr>
<td>Germany</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>Poland</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td><strong>World total</strong></td>
<td><strong>5 397</strong></td>
<td><strong>1 546</strong></td>
</tr>
</tbody>
</table>

Source: FAOSTAT
Exceptionally fertile Ukrainian soil

Ukraine is richly endowed with chernozem (also known as “black soil”), one of the most fertile soils worldwide. Ukraine accounts for about 25% of the global chernozem area.

Chernozem, a black-colored soil that contains a very high percentage of humus (3% to 15%) along with phosphoric acids, phosphorus and ammonia, occupies 41% of Ukraine’s total area and even more of its agricultural land (54%), and arable land (58%). Only two chernozem belts exist worldwide: one extending from northeast Ukraine to Russia, and the other – in the Canadian Prairies.

Depth of humus layer in Ukrainian soil

Source: Ukrainian Agriculture Ministry, Dragon Capital
Avarage carbon content in the topsoil
Score: % in weight

United Kingdom | 7.0
Canada | 4.3
Russian Federation | 3.9
Poland | 3.4
Germany | 3.0
Ukraine | 2.3
USA | 1.5
Argentina | 1.5
France | 1.4
Spain | 1.3
Brazil | 1.2
Kazakhstan | 1.0
India | 0.9
Australia | 0.6

Source: FAOSTAT

Low land rental rates

The market for agriculture land is non-existent in Ukraine. Sale and purchase of agricultural land are prohibited by the law. Hence, renting agricultural land from private owners or the state is the only way to build an agricultural company in Ukraine.

Rental rate for state-owned or municipally-owned land is set at the minimum level of 8% of land’s normative value that is calculated based on methodology set by the Government.

There is no regulation as to rental rate for privately-owned land. Historically, these rates have been rising as the demand for agricultural land in Ukraine has been increasing. In 2015-2017, rental rate for privately-owned agricultural land was in the range of 8-14% of land’s value (although, they are not necessarily linked to it as in the case of state-owned or municipally-owned land), with the tendency of moving to the upper limit.

In 2017, average annual rental rate for agricultural land in Ukraine was USD 52 per hectare. But there is significant variation of average rental rates between different regions of Ukraine. Thus, lowest average rental rate was registered in Zakarpattya region (USD 27 per hectare per year), and the highest – in Cherkasy region (USD 111 per hectare per year).7

In 2017, the State Service of Ukraine for Geodesy, Cartography and Cadaster auctioned 37.3 thousand hectares of state-owned lands mostly in Odessa, Chernigiv and Kherson regions. The average rental rate was USD 165 per hectare per year or +14.5% of land’s normative value.7

6For details please see section 1.5. Legal and regulatory framework of this report
7The State Service of Ukraine for Geodesy, Cartography & Cadaster
Competitive cost of labor

In 2017, about 3 million Ukrainians were working in agricultural industry, or 17% of total labor force. Ukrainian agricultural producers enjoy several competitive advantages over their foreign peers, particularly low labor costs. Labor force is abundant, inexpensive and highly qualified. In 2017, agricultural companies in Ukraine payed farm workers on average USD 220 per month.

Fertilizers and crop protection products

As agriculture in Ukraine becomes more and more intensive, usage of fertilizers and pesticides in Ukraine has been improving over the last 10 years. Still, Ukrainian agricultural producers use 2-3 times less fertilizers and 1.5-2 times less pesticides per hectare than their peers in Europe, USA, Canada, India and China.

Primary reasons for underuse of fertilizers and pesticides include inability to buy agricultural land (hence, reluctance to invest in land productivity above the required minimum), limited access to capital and lower level of intensity of agriculture in Ukraine as compared to peers.
Crop yields

Since 1990, when crop yields in Ukraine were at their low, they were improved significantly with the increasing intensity of local agriculture:

The trend to increase agricultural crops yield is expected to continue.
However, average crop yields in Ukraine are still lower than in European Union due to insufficient application of fertilizers and crop protection products and lack of modern machinery in the fields.

Crop yields in Ukraine are also far below its genetic potential, thus, there still is significant upside potential:

- Crop yields could be increased by 50% on average just intensifying agriculture and applying modern approaches and technologies (precision agriculture);
- Many farming companies are consistently achieving (and exceeding) US and EU yields at lower costs.

Source: FAOSTAT

**Excluding melons**
Logistics

Ukraine has a well-developed infrastructure to support agricultural exports, which still requires quality and efficiency improvements.

Ukraine scored 2.7 on World Bank’s Logistics Performance Index (LPI)\(^{12}\) in 2016, compared to 4.2 as the highest score among the selected European countries, the US and Japan.

### LPI in select countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Germany</th>
<th>USA</th>
<th>Japan</th>
<th>Australia</th>
<th>Korea</th>
<th>China</th>
<th>Turkey</th>
<th>Ukraine</th>
<th>Russia</th>
<th>Paraguay</th>
<th>Belarus</th>
<th>Syria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.2</td>
<td>4.0</td>
<td>4.0</td>
<td>3.8</td>
<td>3.7</td>
<td>3.7</td>
<td>3.4</td>
<td>2.7</td>
<td>2.6</td>
<td>2.6</td>
<td>2.4</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Source: World Bank

\(^{12}\)Benchmarking tool developed by the World Bank that measures performance along the logistics supply chain within a country (compares 160 countries)
Rail road and automobile roads are the main transportation lines within Ukraine. River shipping is less popular but retains enormous potential. In 2017, almost 70 million tons of agricultural cargo was transported within Ukraine.

**Internal transportation of agricultural products in Ukraine**

Score: m t  
Period: 2017

<table>
<thead>
<tr>
<th>Mode</th>
<th>Score (m t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail road</td>
<td>35.7</td>
</tr>
<tr>
<td>Automobile transport</td>
<td>32.9</td>
</tr>
<tr>
<td>River shipping</td>
<td>0.4</td>
</tr>
<tr>
<td>Other</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Source: Ukrstat

Exports and imports are done predominantly through seaports on the coasts of Black and Azov Sea.

**Rail road.** With 22 thousand km of tracks, Ukrainian railroad network is the busiest in Europe. National railroad network services all national sea ports on Black and Azov seas, and connects to railroad networks of Poland, Slovakia, Romania, Hungary, Moldova, Belarus and Russia.

**Automobile roads.** With total length of 164 thousand km, automobile roads interconnect all regions of Ukraine. Major automobile routes stretch from East to West (Lutsk-Rivne-Kyiv-Poltava-Kharkiv and Lviv-Ternopil-Kropyvnytskyi-Dnipro-Eastern Ukraine) and North to South (Chernihiv-Kyiv-Odesa and Kharkiv-Dnipro-Zaporizhia).

**River shipping.** Ukraine has over 2 thousand km of operational river routes on Dnipro and Pivdennyi Buh rivers. Both rivers connect agricultural regions of Ukraine with sea ports in their deltas (Kherson and Mykolaiv, respectively) and on the coast of Black and Azov seas (Odesa region).
Storage and shipping (grain and oilseeds)

Existing storage infrastructure of 47 million tons allows simultaneous storage of 70-80% of annual harvest of grains. Additional 15 million tons will be needed to ensure that 100% of the currently harvested grains can be safely stored.

Poltava, Odesa, Vinnitsa, Kharkiv, and Dnipro regions possess the largest storage volumes in Ukraine, jointly accounting for 38% of total storage capacity in volume terms.

Currently, about 1,000 certified elevator complexes operate in Ukraine (36 million tons capacity). Silo elevators are 46% of total storage capacities, floor-type granaries constitute 54%. ~20% of total storage capacity is managed by state-owned operators.

Ukraine can ship over 40 million tons of grains and oilseeds annually through 13 sea ports with appropriate modern facilities. Over 60% of shipping volumes are concentrated in the Odesa region (Odesa, Illichivsk, and Yuzhny ports).
Legal and regulatory framework

**Title to land**

The agriculture land is restricted from free circulation in Ukraine. Until the relevant law is in place and moratorium is lifted, sale and purchase of agricultural land, as well as target agriland use, is prohibited by the moratorium adopted by the Parliament. The moratorium has been first adopted in 2002 for a 1-year period, and since then it has been extended every year.

The moratorium does not prohibit renting agricultural land. Hence, all agricultural companies in Ukraine have built their land banks based on rent agreements with large numbers of small-scale individual land owners. The amount of rent payment for agricultural land is regulated by the State Service of Ukraine for Geodesy, Cartography & Cadaster.

Foreign citizen and legal entities are prohibited to own agricultural land in Ukraine. (Ownership of non-agricultural land by foreign legal entities is allowed but limited.)

**Subsidies**

The subsidies system for agricultural producers was introduced on January 01, 2017, simultaneously with cancellation of long-existent special VAT regime for agricultural producers.

The subsidies were meant to be provided in 2017-2021 to agricultural companies that export their products. Total amount of subsidies for each year was meant to be not less than 1% of total export revenue by the agricultural sector. In 2017, subsidies to agricultural producers amounted to approx. USD 160 million, or 0.14% of GDP.

According to the approved state budget for 2018, the total amount of subsidies to agro business for the current year stands at almost USD 240 million. The Government plans to direct the funds to support programs for agricultural sector, including approx. USD 150 million for animal farming, USD 38 million for farmers and farmer cooperatives, USD 36 million for production of agricultural products, USD 11.5 million for planting new gardens and vineyards and other smaller programs.

**VAT on export of raw oilseeds**

In December 2017 with the purpose of stimulating of local agro processing and export of higher-added-value products, the Parliment introduced amendments to the Tax Code of Ukraine. The new bill provides for full reimbursement of VAT on the export of sunflower seeds and a temporary freeze of VAT reimbursement for exporters of soybeans (September 2018-end 2021) and rapeseed (January 2020-end 2021).

In practice, exporters of the above raw oilseeds will be obliged to pay VAT to their suppliers but will not be able to claim VAT refund on export. Ultimately it might lead to reduction of prices and production volumes of the mentioned oilseeds.
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FTAs and agricultural quotas
Ukraine has around 17 effective free-trade agreements and bilateral trade agreements that set various terms of international trade, including quotas and tariffs, covering 45 countries.

EU-Ukraine Deep and Comprehensive Free Trade Agreement (DCFTA) is the most important one. It sets terms of trade with EU, Ukraine’s largest trade partner. DCFTA became effective on January 1, 2016. It provided that most agricultural quotas will gradually increase to their maximum level within 5 years. In mid-2017, EU increased select quotas for Ukrainian agricultural exports to EU.

Key agricultural companies in Ukraine
As of end-2017, top-70 agricultural companies in Ukraine operate approximately 6 million ha or roughly 20% of arable land. Of those, the largest company operates more than 600 thousand ha, the smallest one – around 30 thousand ha.
## Key facts about top-10 agricultural companies in Ukraine

<table>
<thead>
<tr>
<th>Company</th>
<th>Land bank, thousand ha</th>
<th>Specialty</th>
<th>Revenue, USD</th>
<th>EBITDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UkrLandFarming</td>
<td>605</td>
<td>Crops production, Milk and milk products, Meat production and processing, Eggs and egg products, Sugar</td>
<td>Publicly not disclosed</td>
<td>Publicly not disclosed</td>
</tr>
<tr>
<td>Kernel</td>
<td>603</td>
<td>Largest producer and exporter of sunflower oil in the world, Grain storage and trading, Export sea port infrastructure</td>
<td>FY2017: USD 2,169 m (+9% y-o-y)</td>
<td>FY2017: USD 319 m (8% y-o-y)</td>
</tr>
<tr>
<td>AgroProsperis Group (NCH)</td>
<td>430</td>
<td>Crops production (grains and oilseeds)</td>
<td>Publicly not disclosed</td>
<td>Publicly not disclosed</td>
</tr>
<tr>
<td>mhp</td>
<td>370</td>
<td>Poultry production and processing, Grain and fodder production, Meat processing</td>
<td>2017: USD 1,228 m (+13% y-o-y)</td>
<td>2017: USD 459 m (+11%), margin – 36%</td>
</tr>
<tr>
<td>Astarta-Kyiv</td>
<td>250</td>
<td>Sugar production, Crops production (grains, oilseeds), Soybean processing, Milk and milk products, Biogas</td>
<td>2017: EUR 459 m (+24% y-o-y)</td>
<td>2017: EUR 120 m (-21% y-o-y), margin – 32%</td>
</tr>
<tr>
<td>Mriya</td>
<td>185</td>
<td>Crop production (grains, oilseeds, sugar beet, potatoes)</td>
<td>FY2017: USD 90 m (+33% y-o-y)</td>
<td>FY2017: USD 8 m (+40% y-o-y), margin – 9%</td>
</tr>
<tr>
<td>Agroton</td>
<td>151</td>
<td>Crop production (wheat, sunflower), Poultry production, Milk and milk products</td>
<td>HY2017: USD 16.5 m (-5% y-o-y)</td>
<td>HY2017: n/a</td>
</tr>
<tr>
<td>iMK</td>
<td>130</td>
<td>Crop production and storage (grains, oilseeds, soybean, potatoes), Milk and milk products</td>
<td>2017: USD 127 m (+2% y-o-y)</td>
<td>2017: USD 39 m (-24% y-o-y), margin – x%</td>
</tr>
<tr>
<td>Ukroprominvest Agro</td>
<td>127</td>
<td>Crop production and processing (grains, oilseeds), Sugar production, Milk and milk products</td>
<td>Publicly not disclosed</td>
<td>Publicly not disclosed</td>
</tr>
<tr>
<td>AGRO Generation</td>
<td>120</td>
<td>Crop production and processing (grains, oilseeds)</td>
<td>HY2017: EUR 11 m (+199% y-o-y)</td>
<td>HY2017: n/a</td>
</tr>
</tbody>
</table>

Source: latifundist.com, company data

12Fiscal year ending 30 June 2017
Key agricultural markets in Ukraine
Crops market

Crop farming dominates Ukrainian agriculture accounting for 73% of agricultural output. Popular crops in Ukraine include grains (in particular – corn, wheat and barley), legumes (in particular – soybean), potatoes, sugar beets and sunflower.

Commodity crops account for ~60% of total crop output in Ukraine. For five consecutive years now (2013-2017) Ukraine has been harvesting over 60 million tons of grain and over 16 million tons of oilseeds.

Mostly due to unfavorable weather conditions, grain production has decreased to 61.2 million tons (~4.8 million tons) in MY2017/2018.

Grains account for half of crop production in Ukraine, historically known as a breadbasket of Europe, and constitute the backbone of its agricultural sector.

In 2017, Ukraine harvested around 62 million tons of grain and legumes with an average yield of 43 hundredweight/ha. Despite some production decrease, it is expected to export almost 41 million tons of grains in MY2017/18, while retaining almost 21 million tons for domestic consumption.

Grain production and export dynamics

Source: Ukrstat, UCAB projections
Key agricultural markets in Ukraine

In MY2017/18, Ukraine is expected to export 18 million tons of wheat, 4.3 million tons of barley and 18 million tons of corn. Over 50% of Ukrainian grain exports go to the Middle East and Africa.

Key grains production and export

Score: m t, %

<table>
<thead>
<tr>
<th>Crop</th>
<th>2017 production</th>
<th>Share in total</th>
<th>2017/2018* MY export</th>
<th>Share in total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total grains</td>
<td>61.9</td>
<td>100%</td>
<td>41</td>
<td>100%</td>
</tr>
<tr>
<td>Wheat</td>
<td>26.2</td>
<td>42.3%</td>
<td>18</td>
<td>44%</td>
</tr>
<tr>
<td>Barley</td>
<td>8.2</td>
<td>13.2%</td>
<td>4.3</td>
<td>10.4%</td>
</tr>
<tr>
<td>Corn</td>
<td>24.7</td>
<td>40%</td>
<td>18</td>
<td>44%</td>
</tr>
<tr>
<td>Other grains</td>
<td>2.8</td>
<td>4.6%</td>
<td>0.7</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

Source: Ukrstat, *UCAB projections

MY2016/2017

Score: M tons/%

In MY 2016/17, Ukraine was the #2 largest grain exporter after USA with 11% share in the world’s total export volume #4 in corn, #4 in barley, #6 in wheat.

Source: Ukrstat, AgroGeneration
Key agricultural markets in Ukraine

Export of grains (excluding rice) by country
Period: MY2016/17

Oilseeds are the second most important subsector in Ukrainian crop farming. Key crops include sunflower, soy and rape.

After successful application of export tariffs for unprocessed sunflower seed in mid-2000s, Ukraine has developed a world leading sunflower oil industry and has become #1 exporter of sunflower oil in the world.

Oilseeds production and export dynamics
Score: m t

Sunflower seeds account for more than 60% of oilseeds production and is almost fully processed in Ukraine. Soybean and rapeseed are the almost entirely exported as raw material.
Key agricultural markets in Ukraine

In order to stimulate local processing of oilseeds, amendments to the Tax Code were adopted by the Parliament in December 2017, and put a temporary freeze of VAT reimbursement for exporters of raw oilseeds, including soybean and rapeseed. The intention of the Parliament is to stimulate processing of oilseeds, namely, soybean and rapeseed.

Main crops production and export breakdown

<table>
<thead>
<tr>
<th>Crop</th>
<th>2017 production</th>
<th>Share in total</th>
<th>2017/18* MY export</th>
<th>Share in total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total oilseeds</td>
<td>18.3</td>
<td>100%</td>
<td>4.3</td>
<td>100%</td>
</tr>
<tr>
<td>Soy</td>
<td>3.9</td>
<td>21.3%</td>
<td>2.2</td>
<td>51.2%</td>
</tr>
<tr>
<td>Rapeseed</td>
<td>2.2</td>
<td>12%</td>
<td>1.9</td>
<td>44.1%</td>
</tr>
<tr>
<td>Sunflower</td>
<td>12.2</td>
<td>66.7%</td>
<td>0.2</td>
<td>4.7%</td>
</tr>
</tbody>
</table>

Source: Ukragstat, *UCAB expectations

Global consumption of sunflower oil is rising, and Ukrainian producers gain brand recognition in the world. In MY2016/17, Ukraine produced 6.3 million tons of sunflower oil (+26% y-o-y) and exported 5.8 million tons (+30% y-o-y), while fully covering internal consumption.

The largest buyers of Ukrainian sunflower oil in MY2016/17 were India (35% of sunflower oil exports from Ukraine), China (10%) and Spain (9%).

In terms of world rankings, Black Sea region dominates sunflower oil export market with Ukraine accounting for 57% of global exports in MY2016/17 and Russian Federation – for 21%.

Export of sunflower oil by country

Period: MY2016/17

<table>
<thead>
<tr>
<th>Country</th>
<th>Share in total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ukraine</td>
<td>57%</td>
</tr>
<tr>
<td>Russia</td>
<td>6%</td>
</tr>
<tr>
<td>Turkey</td>
<td>6%</td>
</tr>
<tr>
<td>Argentina</td>
<td>6%</td>
</tr>
<tr>
<td>EU</td>
<td>4%</td>
</tr>
<tr>
<td>Other</td>
<td>4%</td>
</tr>
</tbody>
</table>

Source: Statista

Sugar beets

Despite high volatility of sugar production in Ukraine, positive structural changes took place in the industry during the last decade. As a result, sugar beet yields rose 69% – from 285 hundredweight/ha in 2006 to 475 hundredweight/ha in 2017.

In MY2016/17, Ukraine produced 2 million tons of sugar, out which 0.77 million tons was exported. Key export destinations – Sri Lanka (15% of sugar exports from Ukraine), Georgia (6%) and Turkey (6%).

Source: Ukroliyaprom
Key agricultural markets in Ukraine

Meat market

Meat market in Ukraine is developing slower than markets for other agricultural products. At the same time, the market is going through notable structural changes.

In 2010-2017, per capita consumption of meat (including beef, pork and poultry) in Ukraine fluctuated within 43-48 kg (in carcass weight), amounting to 44 kg in 2017. In 2018 consumption of meat per capita is expected to grow further by 1%. Current level of consumption in Ukraine is 1.5-2.5 times below the level of developed countries (75-120 kg per capita) due to smaller disposable income per household.

Over the same period, Ukraine has moved from being a net importer to being net exporter of meat. Net exports gradually went from -0.25 million tons in 2010 to +0.2 million tons in 2017. In 2018, net exports are expected to grow further by 13% to +0.23 million tons.

### Meat balance

<table>
<thead>
<tr>
<th>Score: k t</th>
<th>Data includes beef, pork and poultry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2010</strong></td>
<td><strong>2011</strong></td>
</tr>
<tr>
<td>Production</td>
<td>1,831</td>
</tr>
<tr>
<td>Imports</td>
<td>298</td>
</tr>
<tr>
<td>Exports</td>
<td>48</td>
</tr>
<tr>
<td>Consumption</td>
<td>2,037</td>
</tr>
</tbody>
</table>

Score: kg per capita

### Consumption

| Consumption | 44.2 | 43.2 | 47.8 | 48.2 | 46.0 | 43.2 | 43.9 | 44.2 | 44.4 |

Source: OECD, FAOSTAT

Structure of meat consumption has been changing. Share of beef has dropped from its peak of 16% of total meat consumption in 2010 to 12% in 2017 and is expected to further drop to 11% in 2018. Share of pork has also dropped from its peak of 36% of total meat consumption in 2012-2013 to 32% in 2017 and is expected to further drop to 31% in 2018. Consumption of poultry has compensated for the decline in beef and pork consumption, with its share rising to 54% in 2017 and 56% in 2018 (expected).

### Cattle breeding

In 2010-2017, beef production in Ukraine has been declining by CAGR of 2.5% due to negative margins. Cattle headcount has decreased from 4.8 million as of beginning of 2010 to 3.7 million as of beginning of 2018. In 2018, beef production is expected to remain flat at 2017 level.

### Pig breeding

Pig breeding in Ukraine is following the path of gradual formation of highly concentrated production conglomerates. In 2010-2015, pork production has been growing by CAGR of 3.8%. Decline in pork production in 2016-2017 is attributed to rising pork prices and declining disposable income of consumers. In 2018, pork production is expected to further decrease by 6% in 2018.

### Poultry production

Poultry is the best-performing subsector of animal farming, both in terms of internal consumption and export. In 2010-2017, poultry production has grown by CAGR of 3.4%, while exports have grown by 8.4x reaching 274 thousand tons. Growth in exports has substituted for fluctuating consumption in Ukraine which is moderately high by international standards.

Poultry farmers enjoy competitive advantage over other meat producers due to low fodder-intensity of poultry (2 kg of grain per 1 kg of poultry as compared to 6.0 kg for beef). Large players in this industry are investing heavily in modernization and new capacities, introducing advanced production technologies.
Key agricultural markets in Ukraine

Dairy products market

In 2017, Ukraine produced 10.3 million tons of milk. In 2010-2017, production of milk has been declining by CAGR of 1.2%, however with an important peculiarity. Decline in aggregate output of milk was fully attributable to decline of production by households (CAGR -2.5%), where it was concentrated traditionally. At the same time, production of milk by industrial producers was increasing (CAGR +3.2%). As a result, share of milk produced by agricultural enterprises increased from 20% in 2010 to 27% in 2017. Households consume or process significant share of milk they produce – 44% and 24% in 2017, respectively.

Milk production in Ukraine

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>by households</td>
<td>11 249</td>
<td>11 086</td>
<td>11 378</td>
<td>11 488</td>
<td>11 133</td>
<td>10 615</td>
<td>10 382</td>
<td>10 329</td>
<td>10 283</td>
</tr>
<tr>
<td>by agricultural enterprises</td>
<td>9 032</td>
<td>8 840</td>
<td>8 842</td>
<td>8 906</td>
<td>8 485</td>
<td>7 946</td>
<td>7 676</td>
<td>7 565</td>
<td>7 428</td>
</tr>
</tbody>
</table>

Export and import of milk and milk products (in weight of unprocessed milk)

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Imports</td>
<td>908</td>
<td>905</td>
<td>763</td>
<td>710</td>
<td>623</td>
<td>96</td>
<td>177</td>
<td>467</td>
<td>853</td>
</tr>
<tr>
<td>Exports</td>
<td>296</td>
<td>273</td>
<td>425</td>
<td>549</td>
<td>354</td>
<td>77</td>
<td>104</td>
<td>132</td>
<td>154</td>
</tr>
<tr>
<td>Other exports</td>
<td>177</td>
<td>(159)</td>
<td>(42)</td>
<td>64</td>
<td>(42)</td>
<td>(15)</td>
<td>46</td>
<td>(12)</td>
<td></td>
</tr>
</tbody>
</table>

Consumption of milk and milk products (in weight of unprocessed milk)

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Food consumption</td>
<td>9 551</td>
<td>9 337</td>
<td>10 164</td>
<td>10 314</td>
<td>9 899</td>
<td>9 182</td>
<td>9 210</td>
<td>8 753</td>
<td>8 726</td>
</tr>
<tr>
<td>of industrially processed milk</td>
<td>4 120</td>
<td>3 904</td>
<td>4 439</td>
<td>4 443</td>
<td>4 317</td>
<td>3 706</td>
<td>3 830</td>
<td>3 588</td>
<td>3 649</td>
</tr>
<tr>
<td>of own milk by household</td>
<td>3 879</td>
<td>3 671</td>
<td>3 782</td>
<td>3 723</td>
<td>3 472</td>
<td>3 565</td>
<td>3 415</td>
<td>3 359</td>
<td>3 335</td>
</tr>
<tr>
<td>of products by household</td>
<td>1 553</td>
<td>1 762</td>
<td>1 943</td>
<td>2 149</td>
<td>2 110</td>
<td>1 911</td>
<td>1 966</td>
<td>1 806</td>
<td>1 741</td>
</tr>
<tr>
<td>Other uses</td>
<td>1 007</td>
<td>1 003</td>
<td>1 035</td>
<td>1 056</td>
<td>901</td>
<td>887</td>
<td>822</td>
<td>809</td>
<td>802</td>
</tr>
<tr>
<td>Stock variation</td>
<td>78</td>
<td>115</td>
<td>(159)</td>
<td>(42)</td>
<td>64</td>
<td>(42)</td>
<td>(15)</td>
<td>46</td>
<td>(12)</td>
</tr>
</tbody>
</table>

Source: OECD, FAOSTAT
Since only around 1/3 of milk produced by households is available for processing by agricultural enterprises, the latter are developing their own milk production. (Quality of milk produced by households is another reason.) In 2017, agricultural enterprises accounted for production of 61% of milk that was processed industrially, compared to 40% in 2010.

### Milk processing in Ukraine

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</tr>
</thead>
<tbody>
<tr>
<td>Total milk production</td>
<td>4 793</td>
<td>4 615</td>
<td>4 716</td>
<td>4 570</td>
<td>4 647</td>
<td>4 251</td>
<td>4 183</td>
<td>4 352</td>
<td>4 408</td>
</tr>
<tr>
<td>by agricultural enterprises</td>
<td>1 904</td>
<td>2 039</td>
<td>2 287</td>
<td>2 344</td>
<td>2 451</td>
<td>2 413</td>
<td>2 538</td>
<td>2 642</td>
<td>2 724</td>
</tr>
<tr>
<td>by households</td>
<td>2 889</td>
<td>2 576</td>
<td>2 429</td>
<td>2 226</td>
<td>2 196</td>
<td>1 838</td>
<td>1 645</td>
<td>1 711</td>
<td>1 684</td>
</tr>
</tbody>
</table>

Dairy cattle headcount in Ukraine is declining. In 2010-2017, total dairy cattle headcount declined by 21.6% (CAGR -3.4%). Both groups, households and agricultural enterprises, have been optimizing their herds, while increasing production of milk per cow. However, agricultural enterprises have been more successful at that. Average production of milk per cow in agricultural enterprises increased from 3.8 tons per year in 2010 to 6.2 tons per year in 2017 (+64%). While in household’s production increased on average from 4.4 tons per year in 2010 to only 4.8 tons per year in 2017 (+8%).

### Cattle headcount and production of milk per cow

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Total cattle headcount</td>
<td>2.6</td>
<td>2.6</td>
<td>2.6</td>
<td>2.5</td>
<td>2.3</td>
<td>2.2</td>
<td>2.1</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>kept by agricultural enterprises</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>kept by households</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>1.9</td>
<td>1.7</td>
<td>1.7</td>
<td>1.6</td>
<td>1.6</td>
<td>1.5</td>
</tr>
</tbody>
</table>

### Production of milk per cow

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Production of milk per cow</td>
<td>4.3</td>
<td>4.3</td>
<td>4.5</td>
<td>4.6</td>
<td>4.9</td>
<td>4.9</td>
<td>4.9</td>
<td>5.0</td>
<td>5.1</td>
</tr>
<tr>
<td>in agricultural enterprises</td>
<td>3.8</td>
<td>3.8</td>
<td>4.4</td>
<td>4.6</td>
<td>5.0</td>
<td>5.3</td>
<td>5.6</td>
<td>5.9</td>
<td>6.2</td>
</tr>
<tr>
<td>in households</td>
<td>4.4</td>
<td>4.4</td>
<td>4.5</td>
<td>4.6</td>
<td>4.9</td>
<td>4.8</td>
<td>4.7</td>
<td>4.7</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Ukraine is a net exporter of milk and dairy products. In 2017, exports amounted to 8% of milk produced in Ukraine (853 thousand tons, in weight of unprocessed milk weight), while imports amounted to only 1% (132 thousand tons).

Key export items include dry milk, butter and cheese.

### Key exports and import of dairy products in Ukraine

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Dry milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export</td>
<td>20</td>
<td>24</td>
<td>28</td>
<td>13</td>
<td>31</td>
<td>37</td>
<td>37</td>
<td>33</td>
<td>35</td>
</tr>
<tr>
<td>Import</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Butter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>Import</td>
<td>6</td>
<td>5</td>
<td>9</td>
<td>14</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cheese</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export</td>
<td>79</td>
<td>80</td>
<td>68</td>
<td>59</td>
<td>23</td>
<td>19</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Import</td>
<td>11</td>
<td>12</td>
<td>17</td>
<td>19</td>
<td>12</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: OECD, FAOSTAT
Global trends and opportunities for Ukrainian agricultural sector
Global trends and opportunities for Ukrainian agricultural sector

Key trends in global agriculture in 2017-2026

1. Growth of global demand is expected to slow down across all agricultural subsectors

- Growth of global demand for agricultural products is expected to slow considerably. The primary factors that supported growth of demand in 2007-2016, including growth of meat and fish demand in China and growth of demand for biodiesel, are not anticipated to support the market in the next decade.

- Global per capita food demand for cereals is anticipated to be largely flat, with growth only expected in least developed countries.

- Meat consumption growth is expected to be limited due to dietary preferences, low incomes and supply-side constraints that curb consumption growth in many countries. Additional calories and protein are expected to come mainly from vegetable oil, sugar and dairy products.

- By 2026, calorie availability is expected to reach 2 450 kcal per day on average in least developed countries and exceed 3 000 kcal per day in other developing countries.

- Growth of global demand for ethanol and biodiesel has weakened recently due to lower fossil fuel prices and fewer incentives from government policies. Demand for biofuel feedstocks, especially maize and sugarcane for ethanol and vegetable oil for biodiesel, is expected to grow slowly.

2. Key supply-side trends

- Growth in crop production will be attained mostly by increasing yields. The global cereal area will only increase marginally, while a further expansion of soybean area is projected to satisfy the demand for animal feed and vegetable oil.

- Growth in meat and dairy production will be achieved from both larger herds and higher output per animal. Growth in poultry production will account for almost half of total meat production expansion over the decade. Milk production growth is expected to accelerate compared to the previous decade.

3. Global trade will maintain its importance to agricultural markets

- Growth in agriculture and fish trade is expected to slow to about half of 2007-2016 growth rate. Given relatively high protection in the farm sector, agricultural trade growth could be boosted by further market liberalization.

- Food imports are becoming increasingly important for food security, particularly in Sub-Saharan Africa, North Africa, and the Middle East.

- Net exports are projected to increase from the Americas, Eastern Europe and Central Asia, while net imports are expected to increase across other Asian and African countries. Exports remain concentrated in a few supplying countries contrasting with widely dispersed imports.

- Real prices of most agricultural commodities are anticipated to follow a slightly declining trend, keeping them below previous peaks over the next 2007-2016.

Source: OECD-FAO Agricultural Outlook 2017-2026 © OECD/FAO 2017
Opportunities for Ukrainian agricultural sector

Ukraine is a fast-growing agricultural producer and exporter, its eyes will be kept on global trends to spot opportunities and minimize risks.

Expected slow-down in demand growth and a slightly declining trend in prices would increase competition among key agricultural exporters.

To maintain and improve positions on global agricultural markets, Ukrainian producers would be required to increase investment in order to decrease production costs, improve products quality, enter higher-value-added and niche segments and improve marketing of their products. These would include:

- Increasing crop yields by catching up on use of fertilizers, irrigation and machinery;
- Decreasing costs by applying precision agriculture technics;
- Investing in additional storage capacity;
- Increasing depth of processing, shifting from export of agricultural commodities to export of food products;
- Entering high-margin niches including fresh and organic products;
- Passing required certification procedures to enter new markets;
- Improving marketing of Ukrainian products to strengthen brand recognition and customer loyalty in key markets;
- Developing and promoting of SME farming.
Global trends and opportunities for Ukrainian agricultural sector

AgriTech – increasing productivity in agriculture through innovation

Modern agriculture is characterized by growing application of innovations to improve productivity and efficiency. Commonly referred to as AgriTech, this sector is engaged in developing and applying new technological in all segments of agriculture.

USA, the Netherlands, Israel, Germany, India and China are also among the world leaders in AgriTech innovations. Ukraine is less engaged – only about 10% of Ukrainian agricultural companies use innovative technologies.

However, over the last few years, Ukraine has demonstrated significant interest to AgriTech. Now there are 70 AgriTech-startups in Ukraine on various stages of development and on different phases of activity.

Farm management solutions
Hardware developers
- RCS
- it lynx
- ARAG
- LIVEAG

Software developers
- CROPIO
- ArpoOnline
- Global GIS

Precision farming solutions
Hardware developers
- efarmer
- IT Innovations
- Skok Agro
- Greenbe

Integrators
- Craft Scanner
- Monada
- Agri Lab

Drone-based and remote sensing solutions
Hardware developers
- AeroDrone
- KRAY
- MEAGRONE

Software developers
- Global GIS
- AGRIYE

Urban farming solutions
Startups
- Craft Scanner
- Monada
- Agri Lab

14 Source: InVenture
15 Source: AgTech Ukraine, AgriTech Unit
Annual volume of investments in Ukrainian AgriTech startups does not exceed USD 4 million. However, there is a growing interest in Ukrainian startups on the part of foreign accelerators and private investors\(^\text{16}\).

The most notable deals in Ukrainian AgriTech include\(^\text{16}\):

- In 2014, KM Core, Ukrainian IT company, invested USD 1.2 million in eFarmer, a precision farming startup;
- Agrieye, producer of unique multispectral camera for remote sensing and soil analysis, raised USD 150 thousand from angel investor in May 2016 and received USD 200 thousand from Norwegian Katapult Accelerator in summer of 2017;
- Drone.ua, developer of agricultural drones, obtained investments from several private investors from the UK, Poland and Moldova in 2017;
- Kray Technologies, developer of unmanned aerial vehicles for spraying crops with plant protection products and growth regulators, received a grant from the US Civilian Research and Development Foundation in 2016 and received further attracted USD 600 thousand of investments from four investors, including Ukraine-based Chernovetskyi Investment Group in 2017;
- B\(\text{I}O\text{sens},\) developer of a mobile food quality testing laboratory, won the Intercontinental Startup Battle in San Francisco in April 2017.

Domestic startup ecosystem, including business accelerators and venture capital companies, is growing around Ukrainian AgriTech industry. One of the most notable examples is AgroHub – collective impact organization that brings together players across the sector to realize multiple collective benefits. Participants include:

- Startup accelerators and coworking spaces – Unit City, Growth Up Business Accelerator, 1991 Open Data Incubator, coworking Platforma (Kyiv), coworking Terminal 42 (Odesa);
- International hubs – Agro Innovation Lab, Thrive;
- Ukrainian and foreign agricultural and related companies – MHP, Astarta-Kiev, IMK, Limagrain, John Deere;
- Financial institutions – IFC, Raiffeisen Bank;
- Knowledge brokers – kmbs, EY, Deloitte, Civitta, UCAB;
- Media – latifundist.com, ain, CТБ TV channel, Зерно magazine.

AgroHub aims to close gaps between startups and corporates, facilitate involvement of talent in AgriTech and change Ukrainian business culture towards more innovation-friendly.

Also, large Ukrainian agricultural holdings become increasingly involve in proprietary and joint AgriTech projects\(^\text{16}\):

- **UkrLandFarming** cooperates with the Bitrek, a Ukrainian telemetry equipment producer. It also has started cooperation with the US based FarmQa company and engages Ukrainian projects dealing with soil density measurement;
Global trends and opportunities for Ukrainian agricultural sector

- **Kernel** funds a startup called CraftScanner, developer of a module to automatically adjust the depth of soil cultivation. Kernel also cooperates with several Ukrainian AgriTech projects including Pixel Solutions, Kray Technology, AeroDrone and Matrix UAV, as well as with such foreign projects as Gamaya and Geoprospectors.

  Kernel is also working on its own solutions in the field of Artificial Intelligence and Big Data. Together with ELEKS, a Lviv based IT company, Kernel is developing the #DigitalAgriBusiness project which is claimed to be the world’s first comprehensive intellectual system to manage agricultural production.

- **AgroProsperis** has its own software called AP Agronomist which has been in use since 2015. AgroProsperis argues that the work of its agronomists has become several times more effective with the introduction of this system.

- In October 2017, **MHP** announced the launch of an agricultural startup accelerator in partnership with Radar Tech. 10 startups will be accelerated with the winners being able to work with the MHP.

  MHP is also developing its own innovations including the GeoInformation System project that collects, processes and visualize all the data related to the land bank management. The company claims that it is the largest innovation project in the world related to the management of agricultural land.

- Since early 2017, **Astarta-Kiev** is advancing the Agro Core, a company it created in partnership with the Borsch Ventures, Ukrainian venture capital fund owned by Evhen Utkin. The project is developing an IT solution for the agricultural market.
Further sectoral reforms to improve business climate
Further sectoral reforms to improve business climate

To fully achieve its potential in agriculture, Ukraine needs to address several legal and regulatory issues, from big to small:

**Land market reform** is desperately needed to allow unrestricted circulation of agricultural land. Introduction of land market would significantly strengthen agricultural companies’ balance sheets, allowing them to attract financing from banks using land as collateral. Ownership of land, as opposed to renting it, would also create additional stimulus for agricultural companies to invest in improving land productivity, including investment in irrigation systems, and shift their focus to a longer-term planning and more sustainable practices.

Viable land market model would require completion of the State Land Cadaster and State Registry of Property Rights, creation of relevant market infrastructure, reduction of restrictions on land demand, securing access to sufficient financing, and transparency of the market in terms of ownership as well as volume and prices of transactions.

Introduction of land market is a crucial part and a standing obligation of Ukraine under Memorandum of economic and financial policies with IMF. According to the World Bank analysis, introduction of land market will facilitate 0.5-1.5% additional GDP growth.

**State Land Cadaster and State Registry of Property Rights** shall be completed by the end of 2018. Complete Cadaster and Register with full and accurate information is crucial to functioning of agricultural land market, including prevention of fraud.

**Elimination of "grey" (shadow) market of grain.** The agrarian sector has been the locomotive of the economic growth in Ukraine in recent years, generating about 12% of the country’s GDP. However, it’s impact on real economy could be influenced by increase of shadow or “grey” schemes, that according to American Chamber of Commerce, constitutes about 40% of all market transactions with grain, oil and other crops when a significant share of currency earnings did not return to Ukraine. The total amount of unreturned currency earnings for 2014-2016 is estimated at the level of USD 3-3.5 billion.

Such shadow schemes negatively affect the state budget of Ukraine as well as the bona fide players of the agricultural market, and, therefore, the existent situation requires counteraction through increase of transparency and monitoring function of State Fiscal service and adoption of the changes to the Tax code of Ukraine. It is proposed by major multinational companies acting in Ukraine to introduce: a) special VAT taxation mechanism on such strategic products, as grain and oil, and b) to envisage mandatory preliminary registration of VAT payer for the entity, that plans during next 30 days to sell considerable volumes of such products.

**Improvement of agro logistics.** In the past 10 years, the volume of major crop exports has increased tenfold in Ukraine. While logistics performance, the availability and quality of its physical infrastructure, including transportation and storage, remain inadequate. To enable the country to 100 million tons of grain annually in 2020s, will take serious investment – in highway, railway, sea ports and the Dnipro river waterway.

National monopoly railway operator “Ukrzaliznytsya” is to be reformed urgently and invest dramatically in upgrade of its locomotive and wagon fleet. Private investments in locomotives renovations could be unlocked through liberalization of railway sector by adoption of the draft Law on Railway transport, and facilitation of the projects on rolling stock modernization.
Further sectoral reforms to improve business climate

Transparent railcars e-distribution need to be launched to solve the issue of “shadow” wagons market supply.

Even provided 20% reduction of the port charges starting from January 1st, 2018, the cost of logistics in Ukraine is still higher by 30-40% compared with the same figures in France, Germany and the USA. Development of new port charges methodology together with liberalization of other port services, introduction of transparent public investments in sea ports infrastructure and ensuring sustainability of private investments will significantly increase competitiveness of agrarian logistic in Ukraine.

The new draft law on concession, recently passed in the first reading in the Parliament, should be adopted in 2018, and enable private sector to participate in providing infrastructure, drawing from international best practices to fashion concession as a most popular form of public-private partnership (PPP). Such co-operation would include rigorous project design from the government side with balanced risk allocation and clearly defined dispute resolution mechanisms.

In the situation when grain production might be improving, Ukraine’s capacity to move truckloads and trainloads to the Black Sea ports is about its limits. The solution might be found in Dnipro river, that currently carries 3-5% of grain export, while in Europe the number is closer to 50%. The Dnipro river offers a great opportunity to develop a low-cost, environment-friendly mode of transport, allowing to move there up to 20-30 million tons of grain export.

Switching to the use of more river freight transportation could easily become a reality with the adoption in 2018 of a draft law on river transport. According to European Bank for Reconstruction and Development (EBRD), Ukraine urgently needs USD 57 million to improve the Dnipro river infrastructure. The EBRD and the European Investment Bank (EIB) are to finance the development of the waterway - when the draft law is passed.

**Privatization of state-owned companies** and property in agricultural sector would greatly improve competition and attract new investment, including FDI. Potential assets for privatization include SOEs that manage agricultural land, grain production, storage and spirits production monopoly.

**Concession of state-owned irrigation systems.** Over the past years a trend of sustained high temperatures in summer in southern regions of the country has been seen, causing crop yields to decrease. Significant investment in irrigation systems in Southern Ukraine is required to offset climate change and improve crop yields.

To realize the full potential of irrigation in Ukraine (expanding irrigation for 1.5-2 million hectares of land), it is necessary to invest USD 2-4 billion in the coming years. Initiative of irrigation PPP/concession would allow to direct private funds for the development of agro production adding potentially 20 millions tones of grain per year.

**New export markets.** Comprehensive and sustainable export promotion campaign of “the products of Ukrainian origin” shall be intensified. Considering recent robust export growth of grain and oil to Asia countries, there is a need to expand the list of specific products (peas, wheat and rapes), that could be sold to these markets by Ukrainian producers.

**Phytosanitary security** on agro production is to be reformed according to the best international practice by adoption the draft law “On amendments to some legislative acts of Ukraine on the settlement of certain phytosanitary procedures”, voted in the first reading in June 2017. It will not only give the access of private business to phytosanitary inspection, but will also unload state-owned labs, and focus their business on phytosanitary fields monitoring and improvement.
Solving old VAT refund claims. Almost all the Ukrainian agrarians acknowledge significant improvement of current VAT refund mechanism. At the same time some of them are unable to refund so called “old” VAT amounts claimed till January 1st, 2016. According to the Tax Code, the Temporary Register of VAT Refund Claims submitted until 1 February 2016 (the date when two publicly available Registers of VAT Refund Claims were introduced) was to be formed by the tax authorities until 1 February 2017, but still is not effective.

A new legislation recently presented in the Parliament, will provide clear and transparent mechanism of claims registration and will not depend on the funds availability in the state budget.

Access to financing for family farmers and rural SMEs is important. In the medium term, lifting the moratorium and improving transparency of land rights will improve the environment for mortgage lending to finance investment and diversification. However, many small and medium farmers keep limited records and have no credit history, which constrains financing in the short term. Measures to help kick-start this market might include: a) training for farmers and banks on how to put together and evaluate viable investment proposals; and b) targeted support, such as partial credit guarantees, that can incentivize banks to lend to small and medium farmers.

Organic production development. Ukraine is the largest producer of organic agricultural products in Eastern Europe. Besides organic exports to the EU offer higher price premiums and a stable source of additional income for rural, organic producers, organic agriculture creates conditions for ecologically safe land use by preserving and restoring soil fertility, overcoming the negative effects of economic activity on the natural environment.
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