# Precision farming technologies in the Ukrainian agricultural sector.

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# Presentation structure

1. General information about research
2. Agricultural sector in Ukraine
3. Crop production
4. Participants of the market
5. Conclusions of research
6. Summary
7. Opportunities and challenges
8. Recommendations and key points

# 1. General information about research

**Research structure**

- ❑ **Executive summary**
- ❑ **Characteristics & structure of crop production in Ukraine**
- ❑ **Situation on the Agritech market in Ukraine**
- ❑ **Survey results**
- ❑ **Policy and Legal situation**
- ❑ **Opportunities and challenges**
- ❑ **Conclusions**
- ❑ **Annex:**
  - ➢ Sowing area
  - ➢ List of companies
  - ➢ Matrix of opportunities
  - ➢ List of Dutch companies interviewed

**Short research description:**

- ▪ **Stage 1 - conducting an interview with Dutch company;**
- ▪ **Stage 2 - formation of a questionnaire and a survey of Ukrainian farmers.**

  **500 farmers have already been interviewed in the following categories**:

  up to 1000 hectares;

  1-3 thousand hectares

  3-10 thousand hectares;

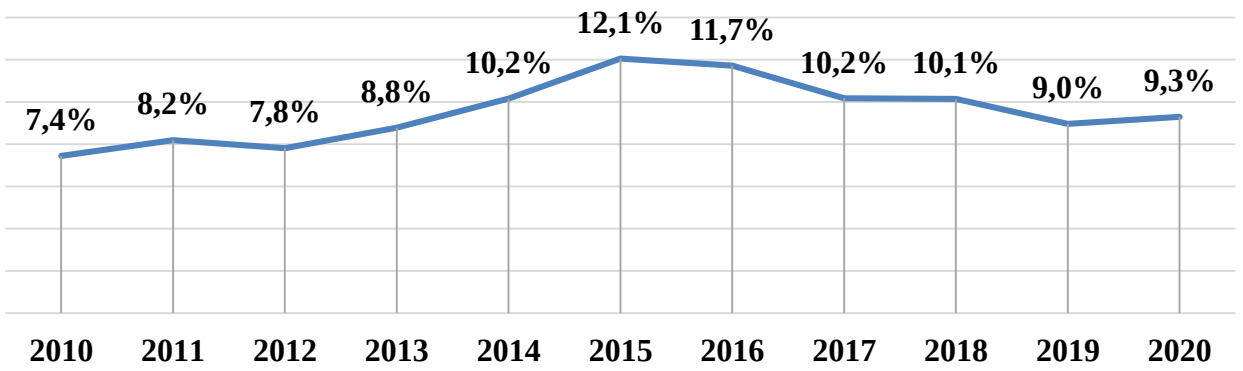
  10+ thousand hectares.
- ▪ **Stage 3 - Preparing a presentation, writing a study and presentation.**

# 2. Agricultural sector in Ukraine

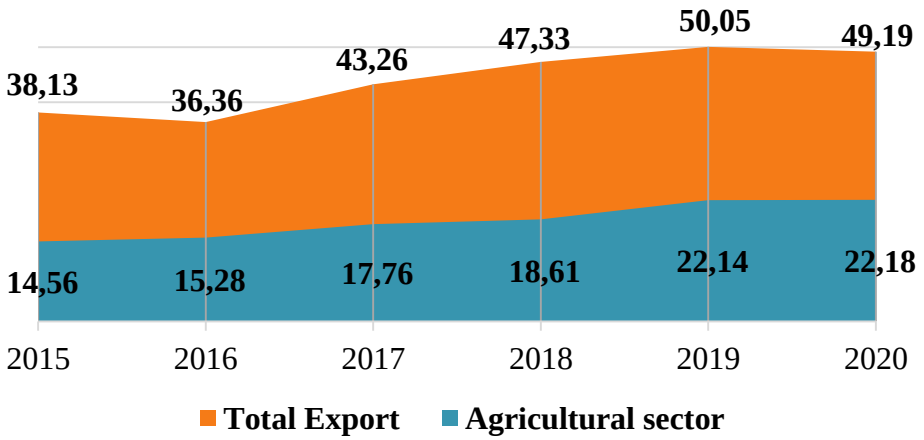
## Agricultural sector in Ukraine

- Agricultural GDP: **14.4 bln USD**;
- Share of the national GDP: **9%**;
- Share of working population: **18%**;
- Structure of agricultural sector, share in GDP: **76% - crop production, 24% - animal production**;
- Overall volume of export: **USD 22.2 billion**;
- Share of in overall exports: **45.1%**;

## Share of the national GDP

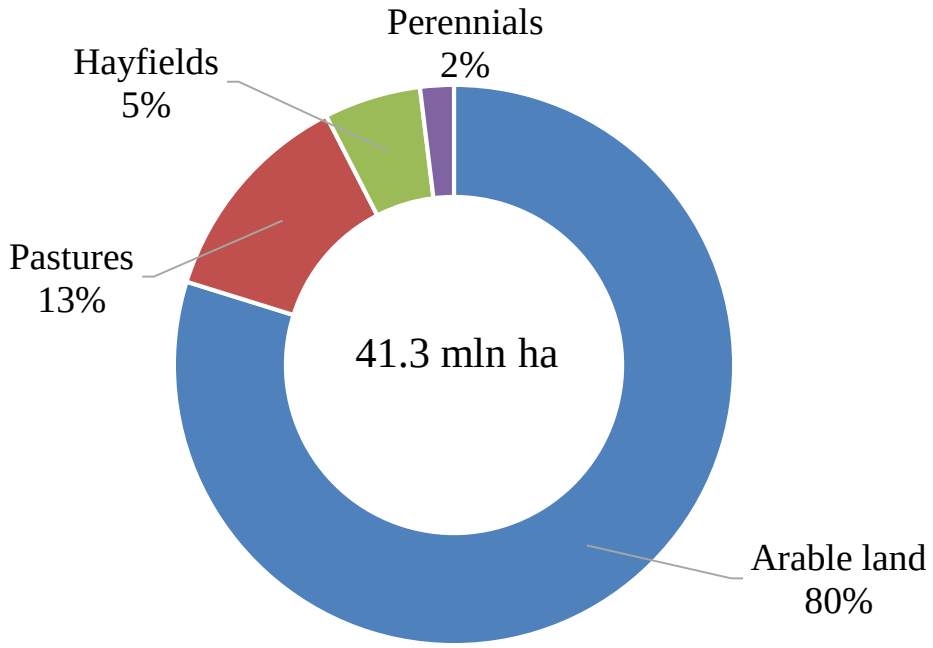



## Export, bln USD

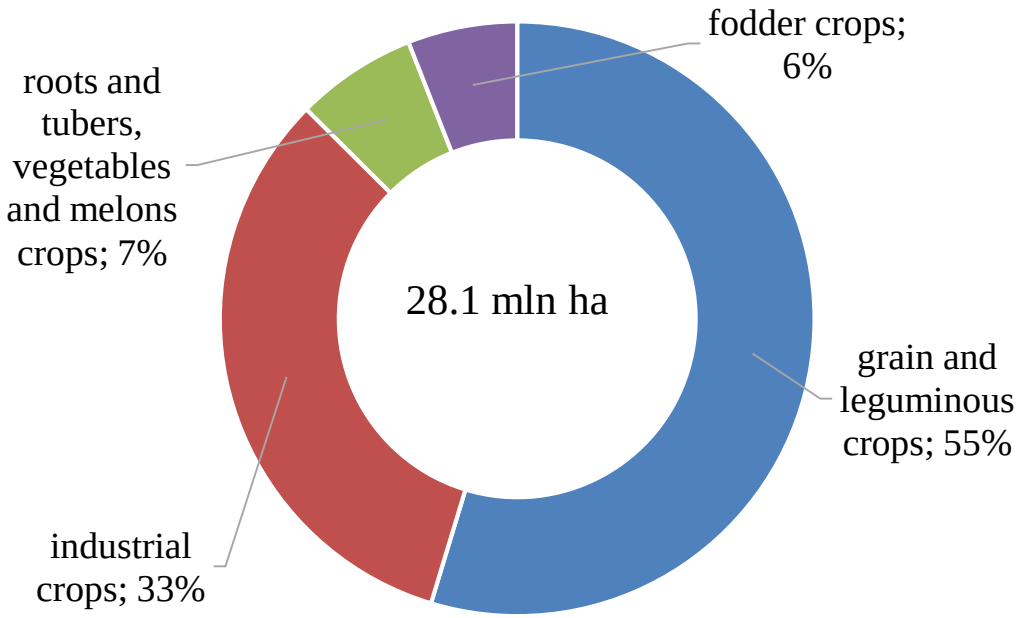


# 3. Crop production in Ukraine

Structure of agricultural land in 2020



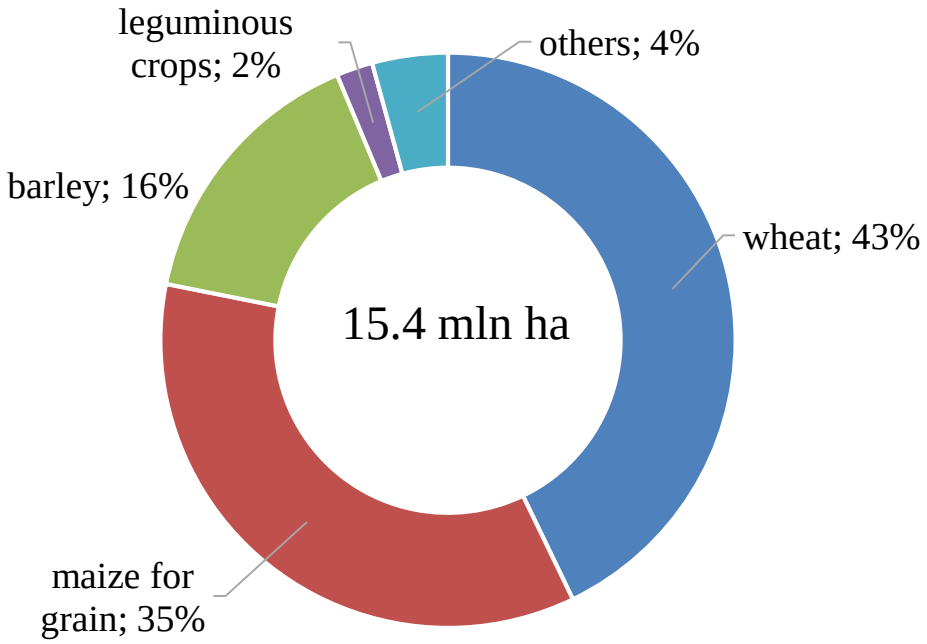

Structure of sown area under agricultural crops in 2020



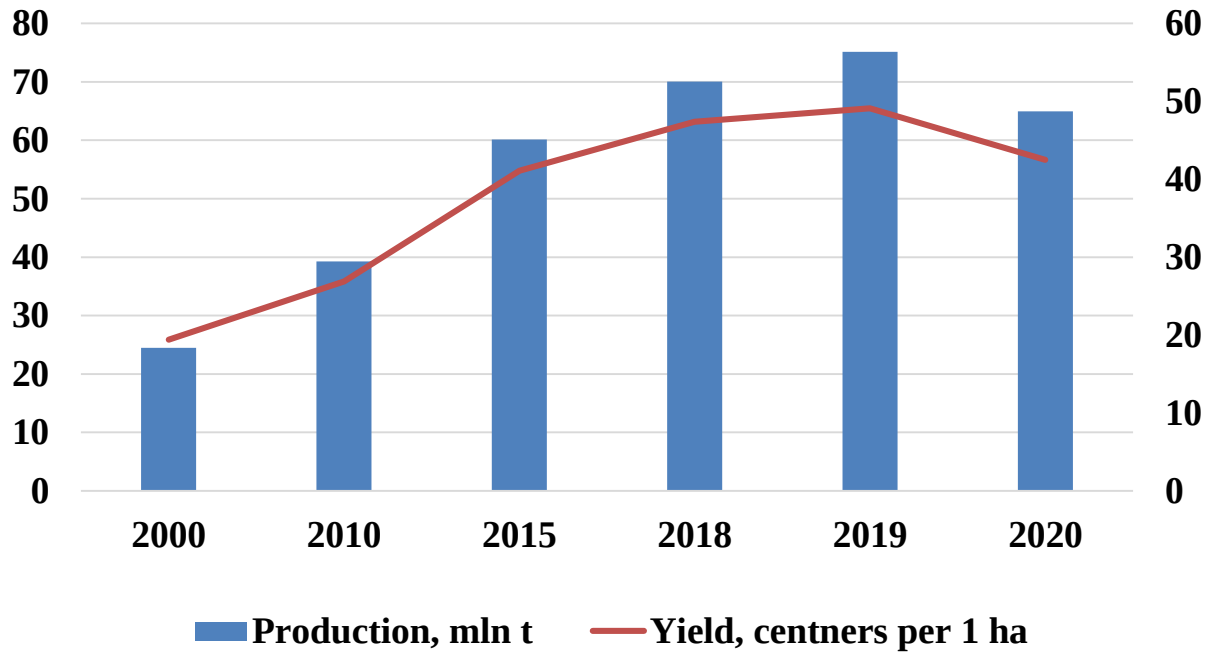

**Source: State Statistics Service of Ukraine**

# Grain and leguminous crops

Structure of the sown area under grain and leguminous crops in 2020




Production and yield of the grain and leguminous crops




**Source: State Statistics Service of Ukraine**

# Grain and leguminous crops

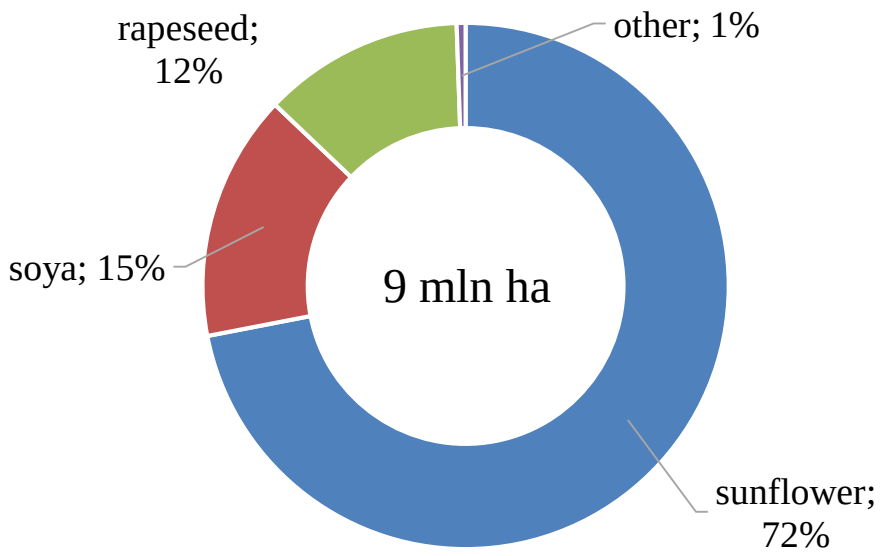
Production and yield in 2021

- wheat (winter and spring) - 32.44 mln tons, yield of 4.6 t/ha;
- barley (winter and spring) - 9.9 mln tons, yield of 4 t/ha;
- peas - 581.5 thousand tons, yield of 2.42 t/ha;
- corn - 40 mln tons, yield of 7.47 t/ha;
- buckwheat - 109.6 thousand tons, yield of 1.3 t/ha;
- millet - 191 thousand tons, yield of 2.45 t/ha;

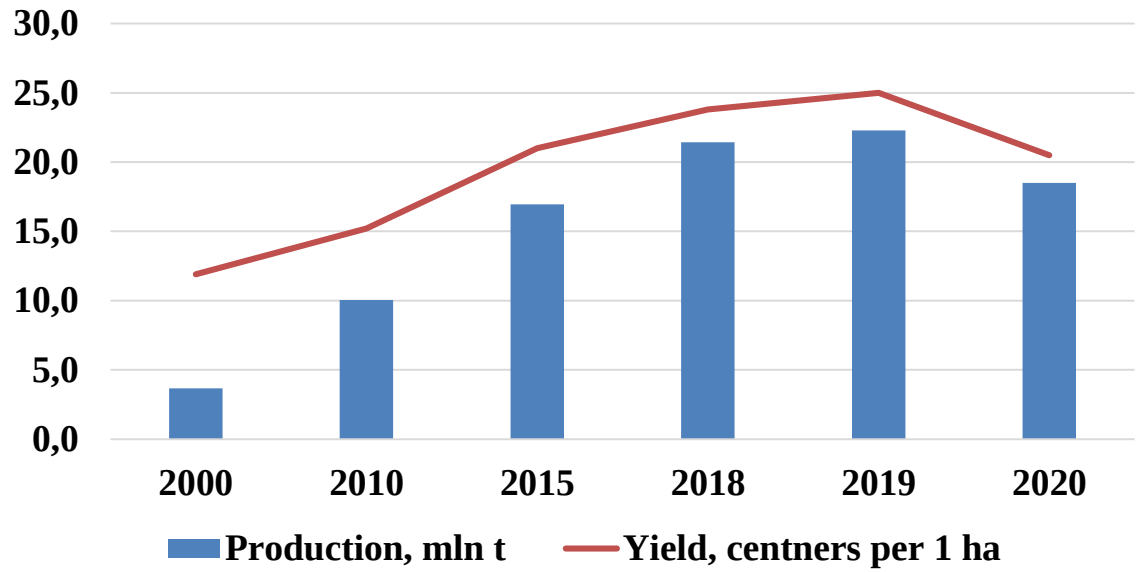
**Source: State Statistics Service of Ukraine**

# Oil crops

Structure of the sown area under oil crops in 2020




Production and yield of the oil crops



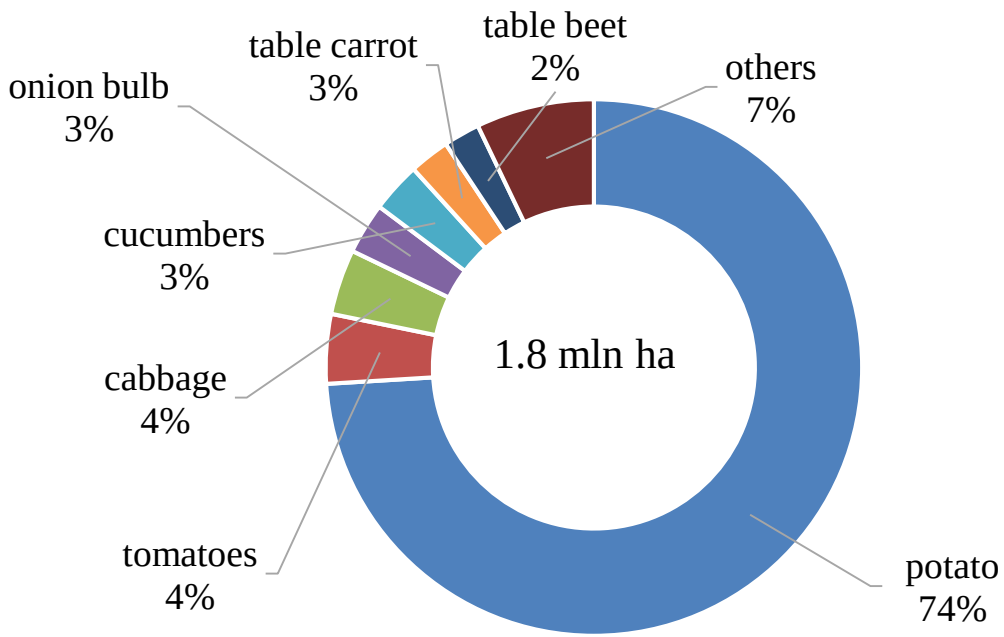

Information about 2021

Sunflower - 16.3 mln tons, yield of 2.51 t / ha;
Soybeans - 3.43 mln tons, yield of 2.68 t / ha;
Rapeseed - 2.9 mln tons, yield of 2.86 t / ha.

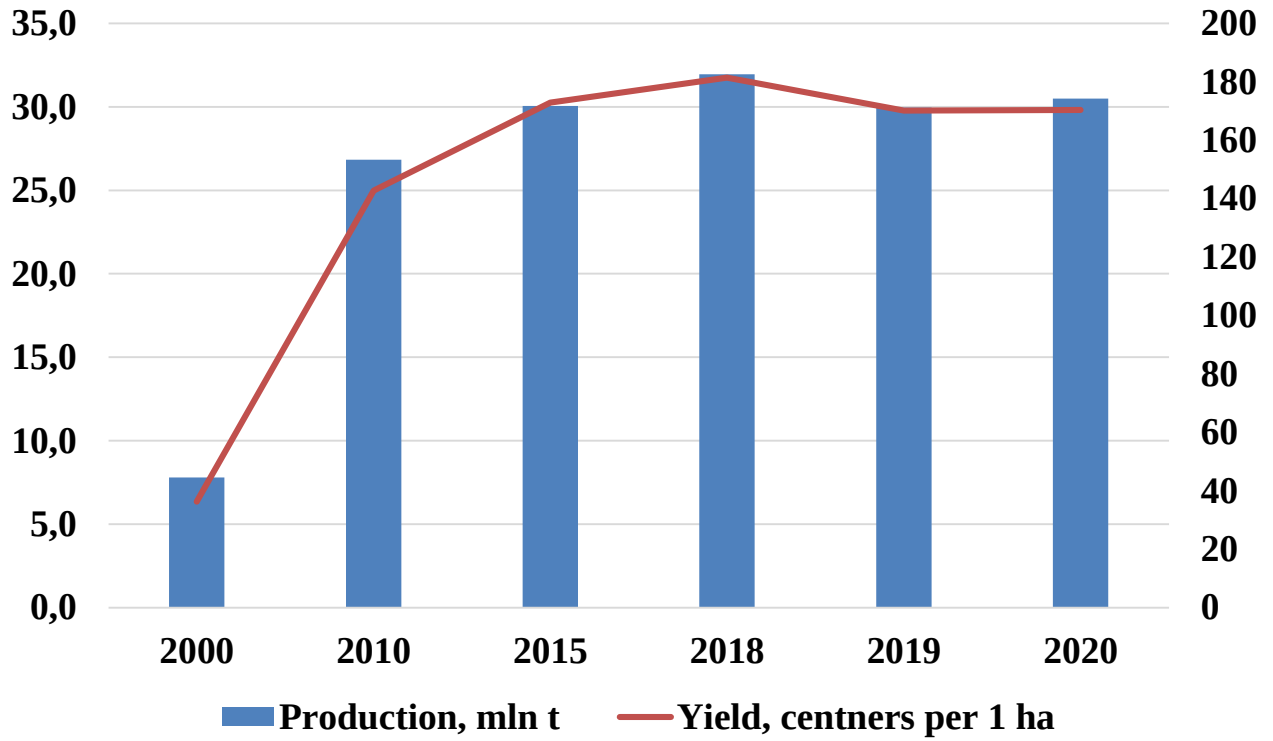
**Source: State Statistics Service of Ukraine**

# Vegetables

Structure of the sown area under vegetables in 2020




Production and yield of the vegetables

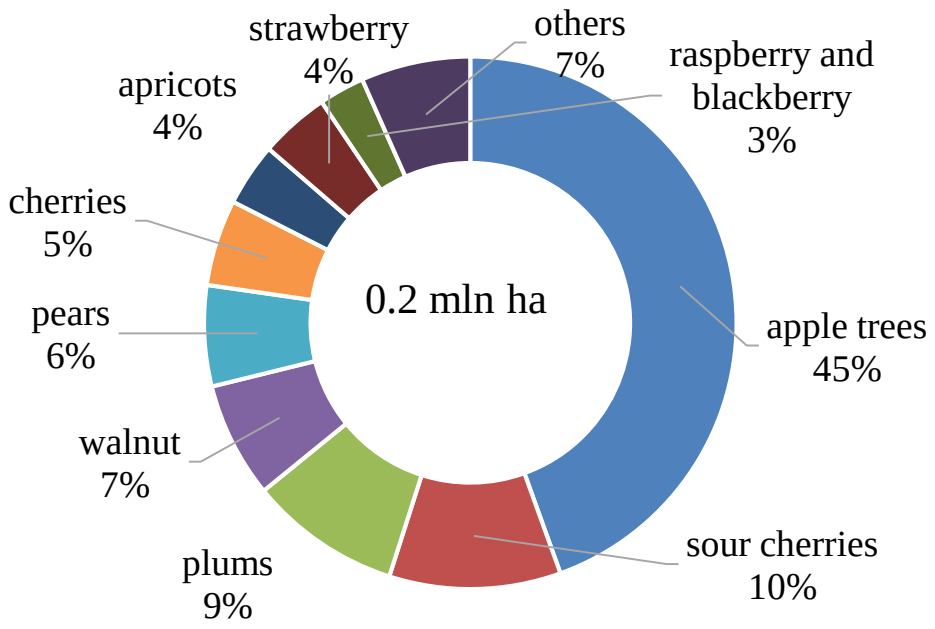



**94% of all vegetables are produced by households**

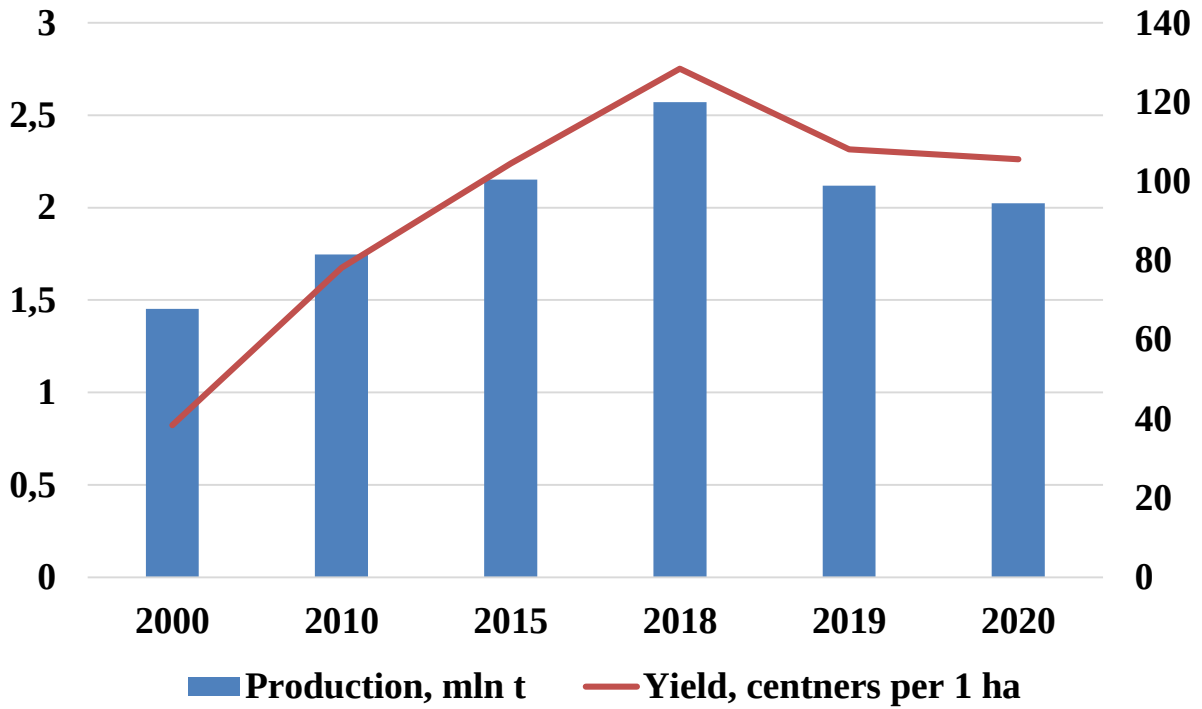
**Source: State Statistics Service of Ukraine**

# Fruits and berries

Structure of the area of fruits and berries plantations in bearing age




Production and yield of the fruits and berries

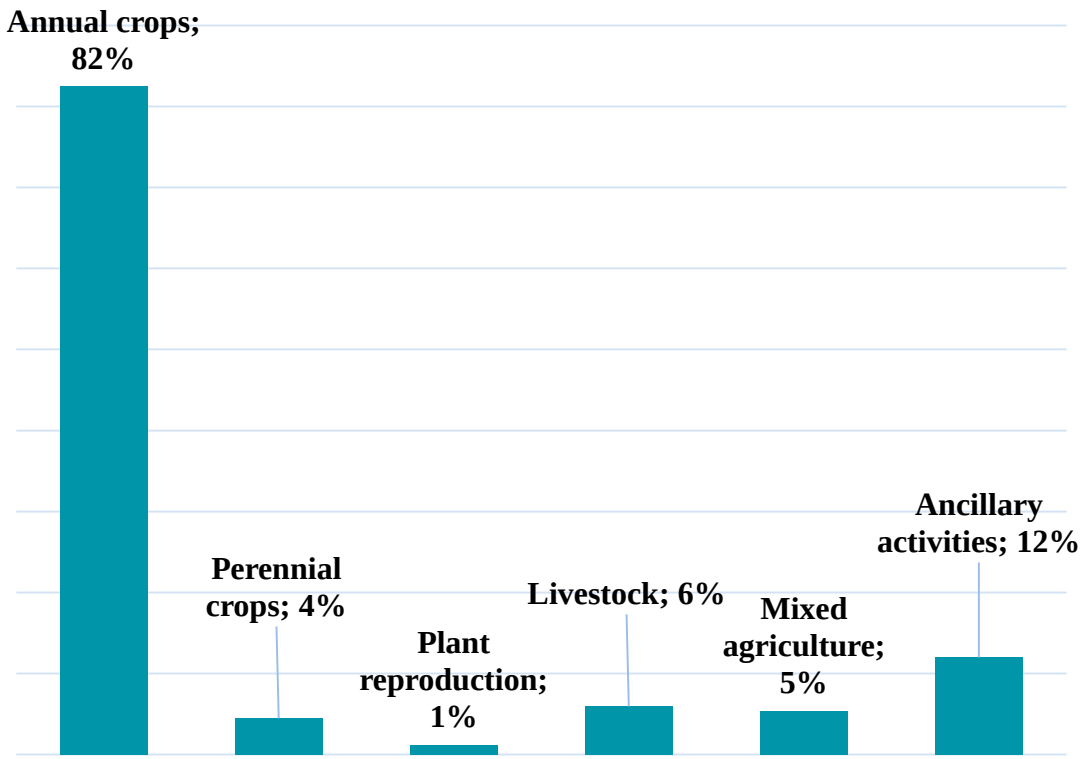



83% of all fruits and berries are produced by households.

**Source: State Statistics Service of Ukraine**

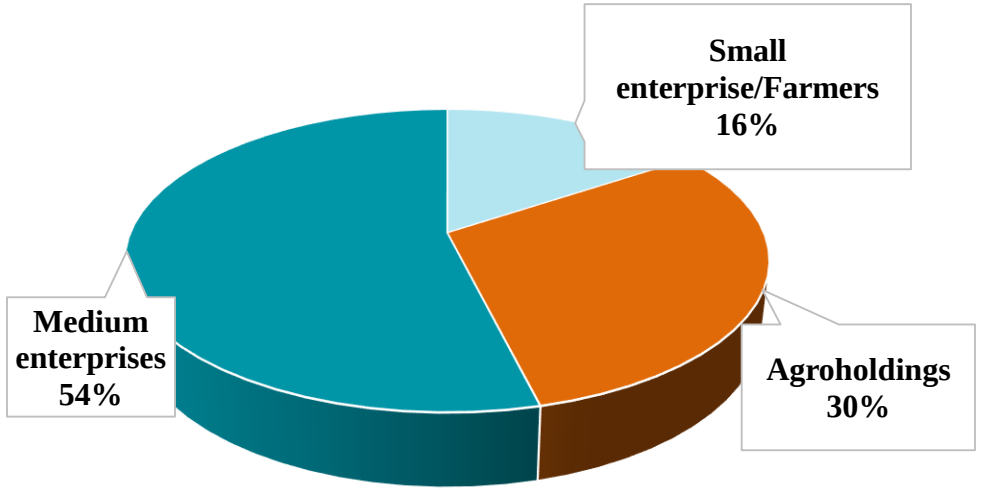
# 4. Descriptions of participants

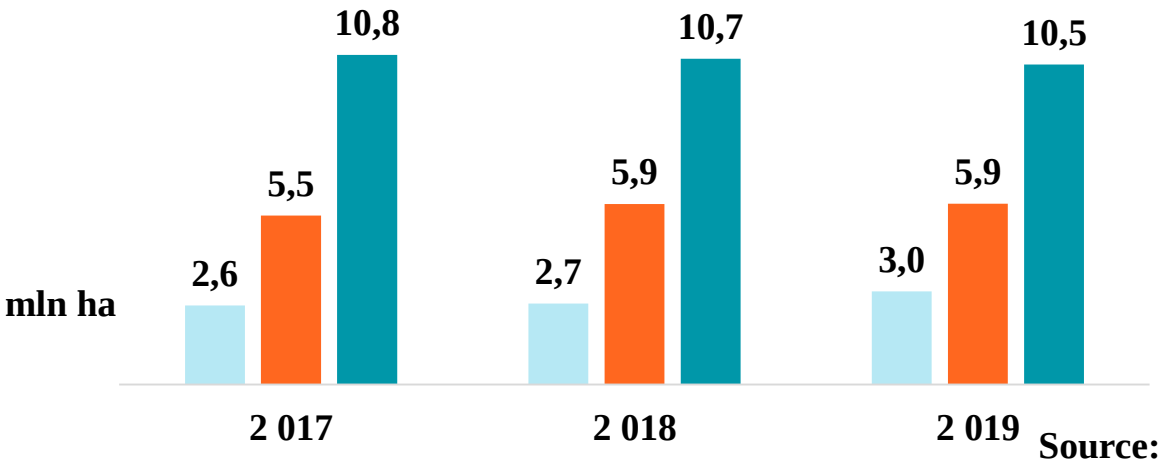
## Structure of the agricultural sector by type of economic activity




Source: State Statistics Service of Ukraine, Vkursi BI

## Structure depending on the land bank




Source: UCAB

# Types of enterprises

## Farmer:

- **Land bank** - from 50 to 1000 hectares;
- one or more owners (family members), who overwhelmingly cultivate land, perform basic functions and production processes.

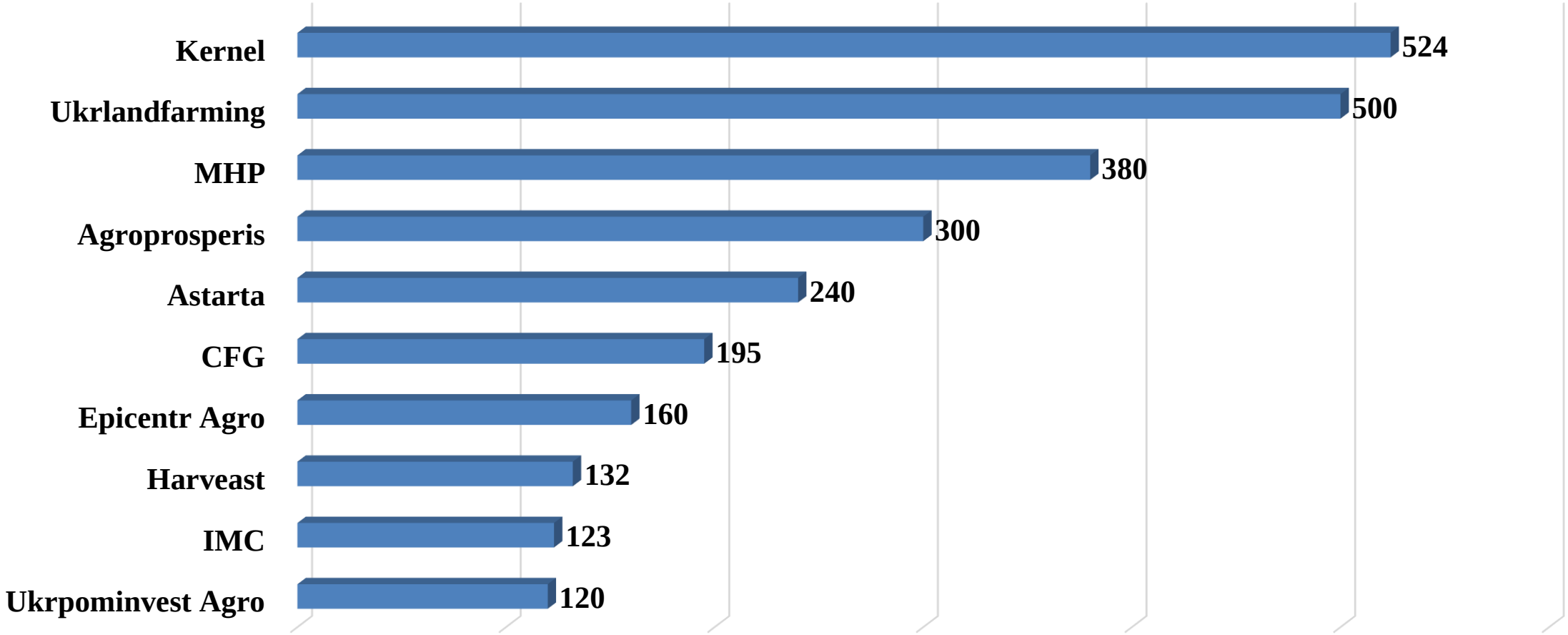
## Medium-sized enterprise:

- **Land bank** - from 1000 to 10 000 hectares;
- One or more owners;
- Most of them have:
  - One/two material and technical base with a fleet of equipment in accordance with the area of cultivated land;
  - Facilities for storing fuels and oils, premises for other resources, etc.
  - Elevators / granaries (for 10 thous. tons of capacity) in their structure (with a land bank of 2000 ha),
  - Dairy farms, orchards etc.

## Agroholding:

- **Land bank** - 10 000 hectares +;
- Group of related legal entities;
- Structure:
  - **Management company (Head office)** - the board, directors for areas, departments, incl. IT or GIS department responsible for the direction of precision farming;
  - **Cluster** - production units where the production / cultivation of agricultural products is carried out. In most of the clusters, there are independent divisions, which are provided with their own management, agronomists, engineers, specialists of precision farming, a fleet of equipment, in accordance with the land bank.

# Top 10 Agroholdings (thos. ha)



# Support directions

- **Partial compensation for the cost of Ukrainian equipment***
- Livestock support
- Support for farming
- **Support for horticulture, berry growing, hop growing**
- **Cheaper loans**
- **Irrigation (purchase of equipment, installation of drip irrigation systems)**
- Agricultural insurance
- Support for organic production
- Support for potato growing and niche crops

**Total budget - 4 bln. UAH (161 mln USD)**

***for 2023, amendments to the legislation are being prepared, which provide for partial compensation of the cost of purchased equipment for precision farming of Ukrainian production (the level of localization of production is 60%, but can be changed for such equipment)**

# 5. Conclusions of research

## Up to 1000 ha

- 85% do not have electronic field maps;
- Only 1/10 use satellite images / NDVI;
- 20% use their own weather stations and soil moisture sensors in their activities;
- Problems with the integrated and consistent use of precision farming technologies;
- Complicated access to financing for the possibility of purchasing more expensive equipment and machinery.

## 1-3 thos.ha

- Field maps – use 47% (digitized 90% + of their fields);
- More than half of the respondents also use autopilots, GPS;
- 38% use satellite imagery / NDVI;
- Problems with the integrated and consistent use of precision farming technologies;
- Complicated access to financing for the possibility of purchasing more expensive equipment and machinery.

# Conclusions of research

### 3-10 thos.ha

- Maps were formed by 67% + respondents, with a high% digitization - 91% of their fields.
- 8 out of 10 farmers in this segment use autopilots, GPS trackers;
- Much more interested in using satellite images / NDVI and meteorological stations / weather data
- More consistent and deliberate implementation of technologies

### 10+ thos.ha

- Taking into account the peculiarities of the work, the implementation of the technology in all clusters is centralized (in most cases)
- The testing and scaling process for all clusters takes up to 3 years (Kernel's case)
- Digitized 98% + fields, using RTK, drones, 90 +% of the equipment with autopilots, GPS trackers, fuel control sensors
- Use satellite images, drones (both independently and by hiring appropriate companies), implement management systems such as FieldView, Cropio.

# 6. Summary

## Expect expanding precision farming

- A wide range of enterprises (from 5 to 500 thousand hectares) with different types of requests and the necessary equipment;
- Application of more innovative technologies helping to reduce the cost of production
- Global trends of more efficient use of land resources, while minimizing application of agrochemicals;
- Opening of the land market, EU Green Deal, reform of irrigation;

## Most popular technologies

- Electronic field maps - well used by middle and large –sized agricultural companies;
- Heading indicators, autopilots, GPS (trackers) and fuel control sensors are used by every 3rd small farmer and 85-92% of middle-sized and large companies;
- Satellite images /NDVI index use is about 16% with the smaller farmers and 71% with the large agriholdings;
- Soil moisture sensors are used by 39% of the farmers;
- Programs for forecasting the appearance of pests and diseases are the least spread due to limited possibility to take into account all factors, and programs of local diseases, pests, have quite predictable forecasts, which are already known to the agronomist of the enterprise.

# 7. Opportunities and challenges

- Opening of the land market;
- Increase in the cost of ag-machinery and equipment;
- Climate change
- Green Deal
- Soil degradation
- Staff and qualifications
- Water availability/ water pollution
- Lack of quality mobile internet all over Ukraine

**Current market opportunities for Dutch companies**

1. **Land reform -** soil conservation and use of more sustainable technologies, land inventory (as part of the land reform in cooperation with local authorities too) ;

2. **Irrigation reform -** constant monitoring of water resources, the state of reclamation systems and control over the use of water in their fields (including, cooperation with local authorities to control water resources);

3. **Green Deal** - efficient use of fertilizers and plant protection products for agrarians, popularization of the use of differential application (fertilization, spraying, sowing) and proposing solutions;

# 8. Recommendations and key points

- Find a representative or a dealer/distributor of services or equipment;
- Language adaptation of software and applications;
- Define the pricing policy in Ukraine which comparable with the price of competitors;
- Try to start partnership with local governments;
- It is necessary to be on the «shorthand» with the farmer/agrarian.
- Be patient when approaching the agroholdings, they take decisions slowly and quickly responsive with middle-sized and “small” agricultural producers.
- Consider prospects/options for cooperation with medium sized agricultural companies or agricultural holdings as part of existing GIS platforms companies that offer satellite monitoring services for the state of crops and the state of fields especially etc.

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# Thanks for your attention!

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