Ministry of Digital Transformation of Ukraine

UKRAINIAN GLOBAL INNOVATION STRATEGY

SECTORAL STRATEGY: **AGROTECH**

(AGRICULTURE AND FOOD INDUSTRY TECHNOLOGIES)

UKRAINIAN GLOBAL INNOVATION STRATEGY UNTIL 2030

CONTENTS

ABBREVIATIONS AND DEFINITIONS

KEY DEFINITIONS

STRATEGY	Ukrainian global innovation strategy until 2030
AGROTECH	AGRICULTURE AND FOOD INDUSTRY TECHNOLOGIES

ABBREVIATIONS

AI	Artificial intelligence
EBRD	European Bank for Reconstruction and Development
EU	European Union
GIS	Geographic information system
GMO	Genetically modified organism
GPS	Global Positioning System
HEI	Higher education institution
IEA	International Energy Agency
IP	Intellectual property
IoT	Internet of Things
ML	Machine learning
pp	Percentage point
R&D	Research and development
SME	Small and medium-sized enterprises
sq.km	Square kilometers
UN	United Nations Organization
VAT	Value-added tax
AUV	Autonomous unmanned vehicle

SUMMARY OF THE STRATEGY AGROTECH IN UKRAINE

UKRAINIAN GLOBAL INNOVATION STRATEGY UNTIL 2030 DEFINES AGROTECH AS ONE OF THE PRIORITY SECTORS OF DEVELOPMENT

The traditionally strong position of Ukraine in the global agro-industrial market in a whole range of product categories can be further improved by developing AgroTech solutions and bring Ukraine to a new level of innovation-active state in this area.

FUTURE ROLE OF UKRAINE IN THE GLOBAL AGROTECH INDUSTRY

PLATFORM FOR AGROTECH SOLUTIONS

Ukraine will concentrate a number of R&D hubs that will conduct research and commercialize it in the AgroTech area, support startups in launching and scaling innovative solutions, and become a platform for exchanging experience with international organizations and companies.

TESTING CENTER AGROTECH SOLUTIONS

A significant amount of agricultural land allows Ukraine to become an international center for testing AgroTech solutions after the development of appropriate testing areas for agro-innovations and testing grounds for autonomous vehicles, both separately and within AgroFood parks.

STRONG POSITION IN THE DOWNSTREAM MARKET

Ukraine has the potential to take a strong position in the bioenergy and bioethanol market due to a stable surplus of agricultural raw materials and the future introduction of advanced processing technologies.

HIGHLY QUALIFIED AGROTECH SPECIALISTS

The planned launch of training programs for specialists in AgroTech and retraining of engineers from other industries in cooperation with HEI will allow Ukraine to develop agro-innovation more effectively and strengthen its political role.

UKRAINE IS ALREADY DEMONSTRATING AGROTECH SOLUTIONS, BUT IT NEEDS TO TAKE STEPS TO SCALE THEM UP TO FULLY UNLOCK ITS POTENTIAL

STRENGTHS

- A wide field for technology adoption due to the large number of players within the agri-food sector
- Availability of a large number of ready-made innovative solutions for the digitalization of the agri-food industry
- Ukraine has the established role as a global hub for agriculture raw materials that can futher increase confidence in Ukrainian AgroTech solutions

WEAKNESSES

- Low culture of innovation among small agricultural producers and lack of technology skills among agri-food sector employees hinders demand for AgroTech solutions
- Insufficient scalability of existing technologies given the limited financial capacity of Ukrainian businesses, lack of incentives and appropriate conditions for encouragement
- Ongoing problems of shadow land use and trade in agricultural products, which limits the potential of the domestic AgroTech market

OPPORTUNITIES

- Stimulating deep processing of agricultural products for the development of Ukraine as an innovative agricultural center of the world
- Introduction of automated agricultural equipment will help overcome physical security challenges and lack of workers
- Ensuring sustainable agricultural production by financing precision farming technologies and technologies that facilitate adaptation to climate change

THREATS

- Difficulties in VAT administration may deter agricultural producers interest in advanced processing
- High risks of destruction of the implemented equipment and accidents as a result of a prolonged full-scale war and mining of agricultural land
- Changing climate conditions increase the risk of lower yields and profitability for agricultural producers

EFFECTIVE DEVELOPMENT OF UKRAINIAN AGROTECH POTENTIAL REQUIRES ADDRESSING REGULATORY, ECONOMIC AND INFRASTRUCTURAL CHALLENGES

IMPLEMENTING AN INNOVATIONS STRATEGY IN AGROTECH SECTOR INVOLVES A NUMBER OF TASKS:

REGULATORY TASKS

- Harmonize Ukrainian legislation with EU regulations in the field of AgroTech, as well as bioenergy and biofuel production
- Develop a regulatory framework for the use of autonomous machinery, robotic systems and precision farming technologies on agricultural land
- Introduce IP protection mechanisms for AgroTech startups and innovations, and include AgroTech companies as residents of Diia.City

ECONOMIC TASKS

- Create grant programs to support AgroTech SMEs and startups, and develop public-private partnerships
- Promote international partnerships to attract investment and implement joint R&D projects in the field of AgroTech
- Launching advanced training programs for AgroTech specialists at HEI and vocational education institutions, as well as promoting cooperation between HEI and business

INFRASTRUCTURE TASKS

- Open R&D centers at leading agricultural universities for research and commercialization of innovations in the field of AgroTech
- Ensure the opening of a network of testing grounds for autonomous agricultural machinery and new agricultural technologies and utilization of existing experimental fields and sites
- Promote the creation of AgroTech parks and innovation clusters in accordance with the principles of reasonable regional specialization in the agricultural sector

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SECTORAL STRATEGY: AGROTECH

1.1 GLOBAL AGROTECH OVERVIEW

DEVELOPMENT OF ADVANCED TECHNOLOGIES, THE NEED FOR AUTOMATION AND ROBOTIZATION OF THE AGRICULTURAL SECTOR, AND THE INTRODUCTION OF ENVIRONMENTAL SOLUTIONS WILL CONTRIBUTE TO THE GROWTH OF THE GLOBAL AGROTECH MARKET

AgroTech involves the use of technology and smart devices to improve the efficiency of agricultural production. Implementing AgroTech solutions allows farmers to mitigate their environmental impact, increase yields, and make informed decisions while ensuring the profitability and sustainability of the agricultural sector.

CURRENT STATE OF THE INDUSTRY IN THE WORLD

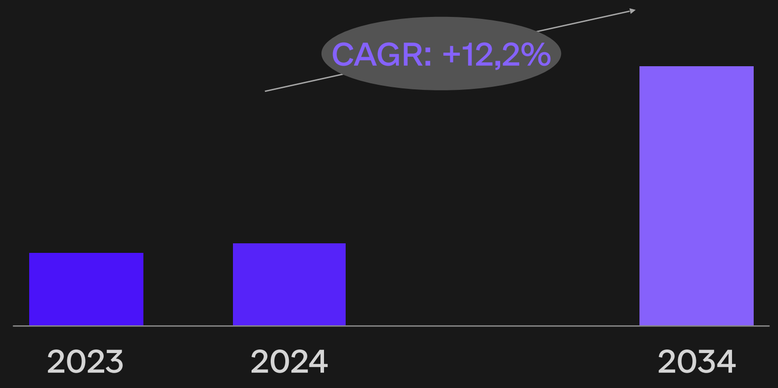
The North American market dominated the global AgroTech market with a 43.0% share in 2023, driven by government initiatives to provide subsidies and tax incentives for the adoption of technologies in the agriculture sector and public-private cooperation in the development and implementation of AgroTech solutions.

FUTURE DEVELOPMENT OF THE INDUSTRY IN THE WORLD

The trend towards the spread of automation and robotization technologies for agricultural processes, as well as increased government support and tax incentives by governments to encourage the adoption of AgroTech solutions will further drive the market growth globally.

The Asia-Pacific AgroTech market is expected to grow at the fastest pace, owing to increased government initiatives and financial assistance for the development of AgroTech.

SIZE OF THE AGROTECH MARKET IN THE WORLD, USD BLN



LARGEST REGION

LARGEST SEGMENT BY USE CASE

North America	Precision farming
43,0 % in 2023	44,3 % in 2023

FAVORABLE GOVERNMENT INITIATIVES AND GROWING CONSUMER DEMAND FOR HEALTHY FOODS ARE DRIVING THE DEVELOPMENT OF THE FOODTECH MARKET

The FoodTech sector includes technologies aimed at leveraging scientific knowledge to improve the way food is produced, processed, packaged, and distributed. FoodTech companies are focused on the development of foods that have increased nutritional value, as well as robotic and digital solutions for the food service industry.

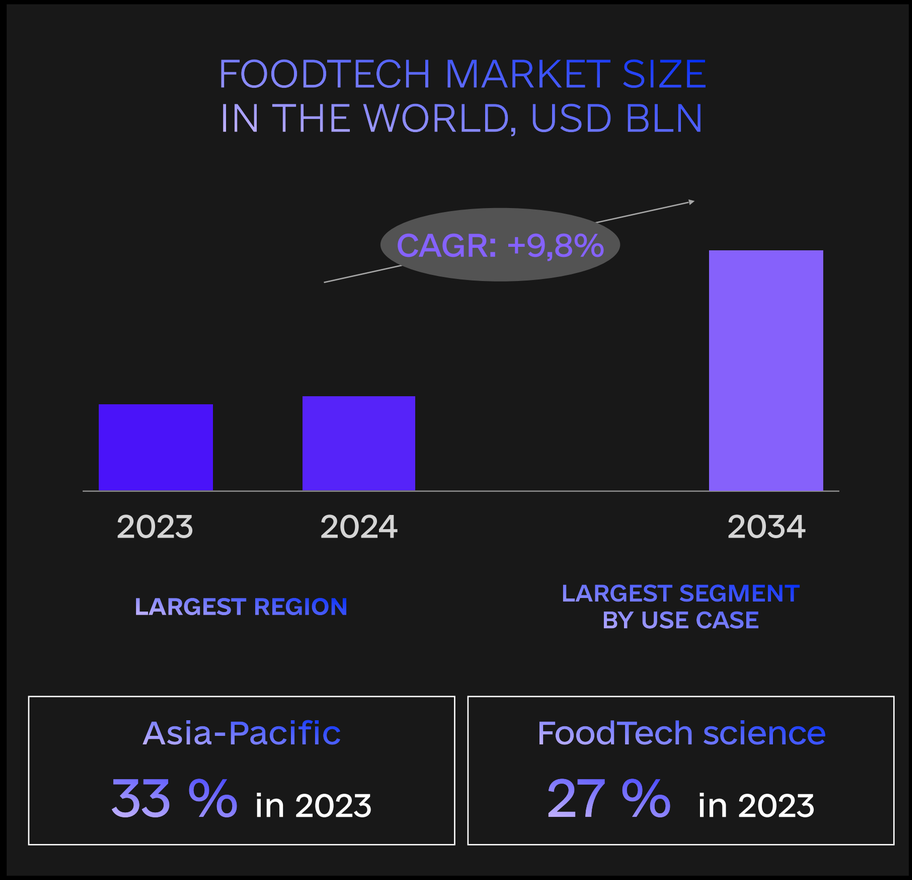
CURRENT STATE OF THE INDUSTRY IN THE WORLD

The Asia-Pacific market size was $60.8 bln in 2023 and has become dominant in the global FoodTech market thanks to large populations, rapid urbanization, and rising incomes in countries like China, India, and Japan, which have created a broad consumer base for food technology products and services.

In addition, the government initiatives to modernize the agriculture and food industry, coupled with technological advances, will further contribute to the region's market dominance.

FUTURE DEVELOPMENT OF THE INDUSTRY IN THE WORLD

The presence of a significant number of food technology companies in the world and investments in R&D will contribute to the further development of the industry. In addition, changing consumer preferences toward healthier and more environmentally friendly foods will drive demand for FoodTech solutions.



INNOVATIVE TECHNOLOGIES CONTRIBUTE TO THE CREATION OF A MORE SUSTAINABLE FOOD SYSTEM AND BOOST THE EMERGENCE OF NEW GLOBAL AGROTECH TRENDS

KEY TRENDS IN THE GLOBAL AGROTECH MARKET

SUSTAINABLE AGRICULTURE

Precision farming technologies and the creation of a new generation of farms (indoor and vertical farms) that can operate in cities will help transform the agricultural industry towards deep automation and increase its sustainability and environmental friendliness.

CONSERVATION AGRICULTURE

The use of methods aimed at improving soil health, biodiversity and ecosystem resilience. This approach embodies transformational change by prioritizing the restoration of land degraded by conventional agriculture.

DIGITAL TWINS AND GENERATIVE AI

Agricultural producers are actively using digital twins and AI to make informed decisions about planting and crop management, optimize resource use, and increase yields with less environmental impact.

AGRICULTURAL BIOTECHNOLOGY

Adapting to the challenges of climate change necessitates the development of resilient crop varieties that are suitable for adverse climatic conditions and adapted to marginal lands and new urban farms.

SUSTAINABLE PROTEINS

Vegetable protein producers are focused on improving plant-based meat production technologies to ensure better product flavor, scale up production, and reach more consumers in the market.

FOOD AS MEDICINE

Strengthening the production of healthy foods and nutritional supplements developed using the latest technologies, as well as developing platforms for ordering ready-made individual diets to follow a personalized diet.

AGROTECH MARKET COMBINES A WIDE RANGE OF TECHNOLOGIES THAT SUPPORT THE INNOVATIVE TRANSFORMATION OF THE AGRICULTURAL SECTOR IN THE WORLD

KEY TYPES OF TECHNOLOGIES: AGROTECH

AUTOMATED EQUIPMENT & ROBOTS

ALLOWS TO INCREASE THE EFFICIENCY OF AGRICULTURAL PRODUCTION AND OPTIMIZE RESOURCE MANAGEMENT

- Autonomous tractors and robotic harvesters equipped with GPS navigation, sensors, and AI are able to independently perform tillage, sowing, and harvesting
- Autonomous irrigation and watering systems for agricultural crops analyze soil conditions to ensure uniform application of seeds, fertilizers and pesticides
- Weeding robots equipped with cameras and ML algorithms to detect weeds and mechanically remove them with spot application of herbicides

AGRI-FINANCE AND COMMERCE

TECHNOLOGIES TO IMPROVE COOPERATION BETWEEN AGRICULTURE MARKET STAKEHOLDERS THROUGH ONLINE PURCHASE AND SALE OF AGRICULTURE PRODUCTS AND SERVICES

- E-commerce platforms based on AI, blockchain and Big Data technologies to increase transparency of the agricultural market, as well as to find partners and suppliers
- Software and platforms for land bank management (sale, purchase, audit of owned and unoccupied land plots)
- Platforms for convenient transactions by agricultural market participants using mobile devices

DRONES

PLANT HEALTH MONITORING, PEST CONTROL, LIVESTOCK MANAGEMENT AND AERIAL PHOTOGRAPHY

- Livestock tracking and pasture identification
- Creating 3D soil maps, which can be used to analyze soil quality and field conditions, as well as determine the most effective sowing schemes
- Fertilization and pesticide treatment for safer and more efficient field processing
- Monitoring of the entire irrigation network to identify any problems in real time

AGROTECH SOLUTIONS INCREASE THE EFFICIENCY OF AGRICULTURAL PRODUCTION AND IMPROVE CROP YIELDS

KEY TYPES OF TECHNOLOGIES: AGROTECH

SUSTAINABLE AGRICULTURE

TECHNOLOGIES TO INCREASE THE SUSTAINABILITY AND YIELD OF AGRICULTURAL CROPS AND IMPROVE PLANT BREEDING

- Development of new seed varieties using CRISPR-Cas9 gene editing technology [1]
- Development of new varieties of agricultural crops with increased resistance to adverse environmental conditions
- Vertical farms - crops are grown in vertically stacked layers in a controlled indoor environment

LIVESTOCK TECHNOLOGIES

TECHNOLOGIES FOR MONITORING, MANAGEMENT AND OPTIMIZATION OF LIVESTOCK FARMING

- Robotic and automated systems for milking and feeding animals, cleaning mechanisms and incubators
- Sensors for monitoring the health of livestock, namely temperature and respiratory rate to detect and diagnose diseases
- AI and IoT-based software for monitoring and analyzing animal behavior, weight, food and water consumption, and predicting the breeding cycle

PRECISION FARMING

TECHNOLOGIES TO INCREASE AGRICULTURAL PRODUCTION AND TRACK THE QUALITY OF AGRICULTURAL PRODUCTS

- Satellite technologies for real-time analysis of areas, topography and crop yields
- Weather stations and soil moisture monitoring sensors to predict precipitation and fertilizer requirements
- GPS monitoring systems and fuel control sensors to optimize resource management
- Software based on AI, Big Data and IoT for timely and accurate detection of crop pests and diseases

1 A biological system for making precise changes to DNA

FOODTECH SOLUTIONS IMPLEMENTATION ALLOWS CATERING ESTABLISHMENTS TO STREAMLINE THEIR OPERATIONS AND IMPROVE CUSTOMER EXPERIENCE

KEY TYPES OF TECHNOLOGIES: FOODTECH

AUTOMATION & ROBOTICS

ROBOTIZATION OF THE CATERING INDUSTRY AND AUTOMATION OF FOOD PRODUCTION PROCESSES

- Culinary robots involved in the preparation of food and beverages
- Robot waiters that meet and greet guests, take orders, and deliver food
- Making unique shapes and personalized dishes with 3D printers
- Ground robot couriers for local food delivery
- Automated vending machines and kiosks that prepare food to order

COMMERCE

TECHNOLOGIES TO OPTIMIZE FOOD SALES AND DELIVERY AND IMPROVE SERVICE

- Mobile apps for ordering and delivering food
- Stand-alone stores with cashless payments
- Digital payment solutions for quick payment (QR codes, Apple Pay, Google Pay) and automated payment terminals for self-service systems
- Online restaurant reservation platforms
- Platforms with ready-made healthy meals and delivery options

FOODTECH SCIENCE

USING TECHNOLOGY TO CREATE NEW TYPES OF FOOD AND BEVERAGES

- Molecular agriculture, the use of genetically modified plants to produce desired proteins
- Alternative protein products of plant origin
- Functional ingredients that are fermentation-based and lower in sugar
- Breeding and processing of insects for animal feed production

GLOBALLY, THERE ARE A SIGNIFICANT NUMBER OF AGROTECH PLAYERS DEVELOPING TECHNOLOGICAL SOLUTIONS TO IMPROVE THE EFFICIENCY OF THE AGRICULTURAL SECTOR

SOME PLAYERS OF THE GLOBAL AGROTECH: AGROTECH

AGEAGLE

Developer of software for agroanalysis and drones for monitoring fields, soil conditions, and crop agriculture.

DJI

The developer of the Agras T30 agro-drone, equipped with a 30-kilogram spray tank for spraying in the fields.

FEEDFLO

Developer of software for monitoring feed supply and consumption and detecting problems in feeding systems in real time.

FENDT

Manufacturer of agricultural tractors with automation and precision farming systems.

GREENEYE TECHNOLOGY

Developer of an AI-based selective spraying system for precise pesticide spraying.

JOHN DEERE

Manufacturer of tractors and combines equipped with intelligent automation systems.

NXIN

Operator of a platform that provides agriculture data, e-commerce and financial services for the agriculture industry.

PLENTY

Growing GMO-free greens and strawberries on vertical climate-controlled farms.

TROPIC BIOSCIENCES

Develops healthier and more resistant varieties of agricultural crops using gene editing technologies.

TYPE OF TECHNOLOGY

- Automated equipment
- Agri-finance and commerce
- Drones
- Sustainable agriculture
- Livestock technologies
- Precision farming

COMPANIES WORLDWIDE ARE ACTIVELY DEVELOPING AND IMPLEMENTING FOODTECH SOLUTIONS THAT MEET NEW USER NEEDS

OME PLAYERS OF THE GLOBAL AGROTECH: FOODTECH

🇺🇸 BEYOND MEAT

A manufacturer of plant-based meat substitutes that mimic the texture and taste of chicken, beef, and pork.

🇺🇸 CAFE X

Developer of a fully automated robotic coffee shop.

🇩🇪 FEEDFLO

Developer of a platform that allows restaurants and suppliers to optimize their food ordering processes.

🇫🇷 INNOVAFEED

Breeding and processing of insects for animal feed production.

🇺🇸 LBX FOOD ROBOTICS

Developer of an AI-based automated vending machine that prepares hot and cold dishes to order.

🇸🇪 OATLY

Produces alternatives to dairy products made from oats.

🇸🇬 ROTIMATIC

Developer of a robotic kitchen appliance powered by AI and ML.

🇫🇷 THEFORK

A platform for booking tables in catering establishments in Europe.

🇩🇰 TOO GOOD TO GO

A platform that allows customers to buy surplus unsold food from restaurants and stores at a lower price.

TYPE OF TECHNOLOGY

Automation Commerce FoodTech science

NEW AGROTECH SOLUTIONS AND STRATEGIC PARTNERSHIPS BETWEEN TECH COMPANIES PROVE THE INTENSIVE DEVELOPMENT OF THE INDUSTRY IN THE WORLD

LATEST PRODUCT LAUNCHES

APRIL 2024

C-DAC, an advanced computing development center in India, has launched SMART FARM, a smart farming system that helps farmers plan irrigation and fertilization based on environmental and soil conditions to maximize crop yields.

APRIL 2024

DJI, a global leader in UAVs and video equipment, has released new Agras T50 and Agras T25 agro drones for fertilizer spraying. The Agras T50 is designed for large-scale crop farming operations, while the lightweight Agras T25 is for more portable use in smaller fields.

JULY 2024

Cropin, an Indian agrotech company, has developed Sage, an agriculture data analysis platform based on Google Cloud and Google Gemini. Sage uses AI to predict weather conditions, future yields, and identify ideal locations and favorable conditions for growing crops.

STRATEGIC INITIATIVES

JULY 2024

The German pharmaceutical company Bayer and the French AgroTech company Elicit Plant have announced a strategic partnership to distribute Best-a and EliZea biostimulation products to combat water stress and increase crop yields during times of water shortage.

AUGUST 2024

French biotechnology company Innovafeed has announced a partnership with US pet food manufacturers Jiminy's and Arch to co-brand new insect-based dog food "Powered by Hilucia".

SEPTEMBER 2024

AgroTech company Corteva and tech company Pairwise, a pioneer in the application of gene editing in the food and agriculture industry, have announced a partnership to accelerate the delivery of advanced gene editing solutions for crops. The collaboration is based on Corteva's $25 million investment in Pairwise.

GOVERNMENTS SUPPORT THE AUTOMATION OF THE AGRICULTURAL SECTOR BY FUNDING R&D FOR THE IMPLEMENTATION OF AGROTECH SOLUTIONS

SOME EXAMPLES OF AGROTECH IMPLEMENTATION IN THE WORLD

🇬🇧 UNITED KINGDOM

- There are four agriculture innovation centers specialized in supporting the development of AgroTech solutions
- The UK government supports R&D in agriculture with £320 million a year, with an additional £90 million through the Industrial Challenge Fund
- According to the UK Department of Business and Trade, there are 4 most promising sectors of AgroTech: aquaculture, animal health, crop production and Precision farming

🇮🇳 INDIA

- The government encourages the use of drones and AI in the agricultural sector and provides financial assistance to farmers for the purchase of drones
- India's Economic Survey 2023 highlighted the growth of India's agriculture sector by 4.6% over the past six years and the emergence of more than 1,000 AgroTech startups
- In 2021, India launched a unified agriculture database that allows AgroTech companies to customize offers and products to meet the needs of farmers

🇨🇳 CHINA

- Technologies such as Drones, IoT, Big Data, and AI are widely used in the agricultural sector to automate farms, ensure precise sowing, cultivation, and irrigation of fields
- The Chinese government supports agricultural R&D to breed and cultivate crops that are more resistant to adverse conditions and new types of crops
- In 2023, the level of mechanization of cultivation and harvesting in the country exceeded 73%, and the number of agricultural machinery equipped with the BeiDou system[1] reached 1,8 million.

1 A satellite navigation system owned and operated by the China National Space Administration

1.2
AGROTECH SECTOR DEVELOPMENT IN UKRAINE

AGROTECH SOLUTIONS CAN INCREASE EFFICIENCY AND OVERCOME THREATS TO THE AGRICULTURE AND FOOD INDUSTRY OF UKRAINE

THREATS THAT ENCOURAGE TECHNOLOGY ADOPTION

GIVEN THE TRADITIONALLY IMPORTANT PLACE OF THE AGRICULTURAL SECTOR IN UKRAINE'S ECONOMY (THE AVERAGE SHARE OF GDP WAS ABOUT 10% OVER THE PAST 10 YEARS), THE DEVELOPMENT AND IMPLEMENTATION OF INNOVATIVE AGRICULTURAL TECHNOLOGIES WILL HAVE A SIGNIFICANT IMPACT ON ECONOMIC GROWTH AND WILL BE KEY TO OVERCOMING EXISTING CHALLENGES.

💥 LOSS AND MINING OF AGRICULTURAL LAND

The occupation of Ukraine's territory caused the loss of 18% of agricultural land from 2021, and 156 thousand sq.km remain mined as of 2024. Technologies will help to clear mines and increase the productivity of available agricultural land.

💼 LACK OF QUALIFIED HUMAN RESOURCES

Military threats have led to the migration, mobilization or death of 150 thousand farmers and agricultural workers. Technologies will help overcome the shortage of labor by automating processes.

🔄 OVERPRODUCTION OF PRIMARY PRODUCTS

Overproduction of agricultural raw materials leads to a decrease in demand for agricultural products. The development of deep processing and the FoodTech sector will contribute to a significant growth in the added value of Ukraine's agriculture.

🐄 GRADUAL REDUCTION OF LIVESTOCK PRODUCTION

In 2018-2022, the share of livestock in agricultural output decreased by 3,2 pp, to 23,1% as of 2022. AgroFoodTech will increase the efficiency of livestock farming and the production of plant-based alternatives to meat products.

🌱 CLIMATE CHANGE AND LAND DEPLETION

Exhausting exploitation of agricultural land and atypical weather conditions in Ukraine have a negative impact on yields. The introduction of precision farming technologies, drainage systems, crop rotation and adaptive crops will increase farming efficiency.

THE AGROTECH SECTOR OF UKRAINE IS ALREADY MAKING A POSITIVE CONTRIBUTION TO THE COUNTRY'S GDP, BUT STILL REMAINS AT A LOWER LEVEL OF ITS DEVELOPMENT COMPARED TO THE GLOBAL ONE

AgroTech Sector ADDED AROUND 3% TO UKRAINE'S GDP IN 2023, but technology development remains below the global level.

Overall, Ukraine's AgroFoodTech is the most developed in the areas of delivery, restaurant software, and satellite imaging technologies.

AgroTech Ukraine annually attracts about

$4 mln

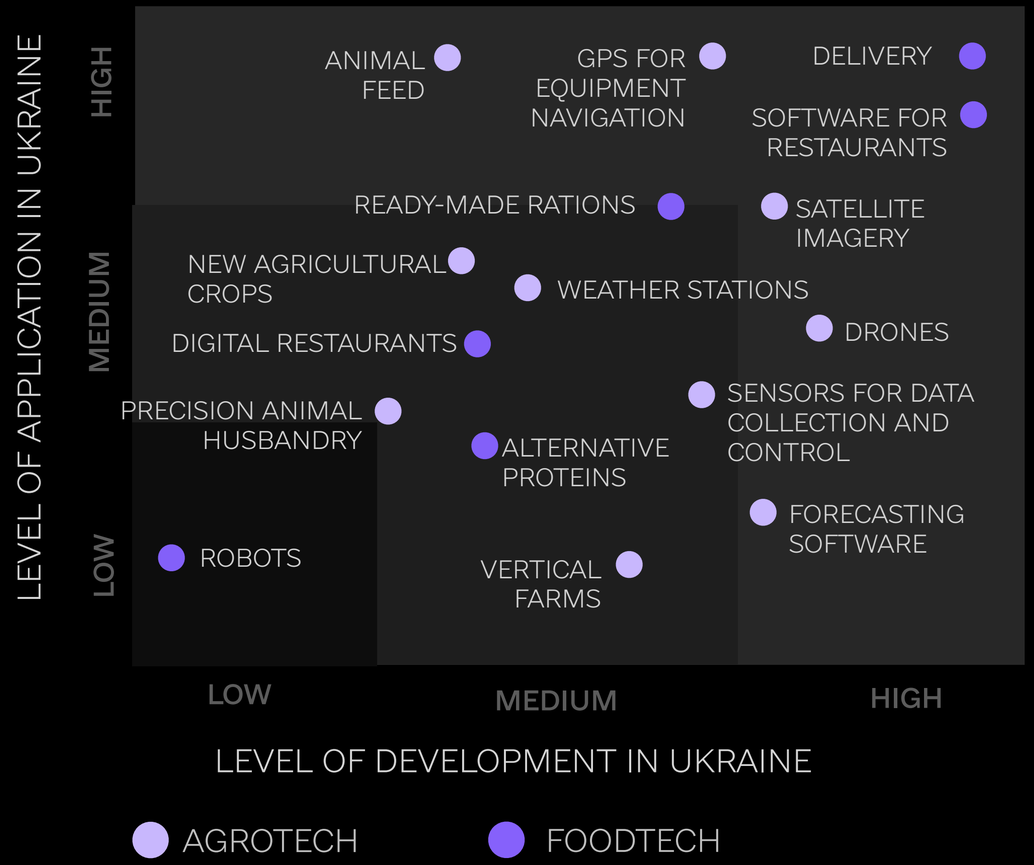
The global total: ~$3 bln

In 2023, FoodTech Ukraine attracted about

$3 mln

The global total: ~$13 bln

AGROFOOD TECHNOLOGIES DEVELOPMENT IN UKRAINE



THE UKRAINIAN MARKET CONSOLIDATES WITH STRONG MATURE COMPANIES, AND UKRAINIAN AGRICULTURAL HOLDINGS INVESTING IN OWN SOLUTIONS DEVELOPMENT

SOME UKRAINIAN AGROTECH PLAYERS

AGRICULTURAL TECHNOLOGIES

SUBSIDIARIES OF AGRICULTURAL HOLDINGS

AGRICHAIN

A subsidiary of the Astarta-Kyiv agricultural holding that develops software for agribusiness management, for internal use and external sales.

KERNEL DIGITAL

A subsidiary of the Kernel agricultural holding that has developed an agribusiness management system for internal use.

MATURE AGROTECH COMPANIES

KRAY TECHNOLOGIES

Developer of a UAV with an auto-navigation system for spraying agricultural fields.

EFARMER

Developer of autopilots and navigation systems for agricultural equipment.

FRAIT

A manufacturer of automated systems for feeding farm animals.

METEOTPEK

The company produces agricultural weather stations with temperature and humidity sensors.

FRENDT

Center for Precision Agriculture — digitizes agriculture, promotes innovative development of agribusiness.

TYPE OF TECHNOLOGY

- Automated equipment
- Agri-finance and commerce
- Drones
- Sustainable agriculture
- Livestock technologies
- Precision farming

The companies mentioned above are examples and do not demonstrate leadership by any indicator

UKRAINIAN AGROTECH STARTUPS ARE DOMINATED BY A FOCUS ON DEVELOPING VARIOUS SOLUTIONS AND AGRODRONES

SOME UKRAINIAN AGROTECH PLAYERS

AGRICULTURAL TECHNOLOGIES

STARTUPS

CULVER AEROSPACE

Developer of a drone for monitoring, surveying, and mapping agricultural fields.

PROFEED

Developer of an IOT system for monitoring feeding and other technological processes on the farm to increase the profitability of livestock farms.

ZEMLYAK

It offers its own app for cooperation and communication between Ukrainian agricultural producers.

GREEN FUTURE

Specializes in growing greens on a vertical farm in underground premises.

HOWCOW

Developer of a smart collar and AI-based software for monitoring cow health.

FARMFLEET

The developer of an online platform that allows agricultural producers to order agrodrones from service companies.

TYPE OF TECHNOLOGY

- Automated equipment
- Agri-finance and commerce
- Drones
- Sustainable agriculture
- Livestock technologies
- Precision farming

The companies mentioned above are examples and do not demonstrate leadership by any indicator

UKRAINIAN FOODTECH IS INCREASINGLY VISIBLE, BUT AUTOMATION AND MEAT PROCESSING TECHNOLOGIES ARE STILL UNDERDEVELOPED

SOME UKRAINIAN AGROTECH PLAYERS

FOOD INDUSTRY TECHNOLOGIES

MATURE COMPANIES

ENZYM GROUP

Production of yeast cell-based food additives and pet food.

AVK

A confectionery company that has launched a new line of patties that are based on vegetable proteins.

ZAKAZ.UA

A platform for ordering and delivering products from partner supermarket chains.

STARTUPS

FOODEX

A platform for preparing and delivering healthy meals.

GREEN GO

A producer of plant-based fish and meat with the capacity to produce up to 500 kg of products per month.

CHOICE QR

Developer of software for restaurants that allows you to manage orders and their payment.

EAT ME AT

Production of minced meat based on soy proteins and hemp protein.

SNECO

Production of functional cheese snacks by microwave vacuum drying.

FOODSTR

Developer of an application for checking food in supermarkets for harmful substances by scanning barcodes.

TYPE OF TECHNOLOGY

Automation Commerce FoodTech science

The companies mentioned above are examples and do not demonstrate leadership by any indicator

AGROTECH MARKET IN UKRAINE IS DEVELOPING BY ATTRACTING INVESTMENTS, ENTERING NEW MARKETS AND COOPERATING WITH INTERNATIONAL COMPANIES

SOME EXAMPLES OF AGROTECH ACTIVITY IN UKRAINE

2023

Ukrainian startup FarmFleet has **delivered the first agrodrones** from Ukraine to the United States.

The construction of Volia Agri-Food Park, an industrial hub for innovative food companies, has begun in Vinnytsia. In addition to private investment, the park received UAH 116 million in government funding.

Ukrainian AgroTech integrator, Frendt, together with weather system developers from Slovakia, announced a plan to launch the first weather radar for farmers in Ukraine.

2024

ChoiceQR, a FoodTech startup, raised $2.5 million in a new investment round in early 2024.

The funds made it possible to enter **four new markets:** Kazakhstan, Georgia, Hungary and Romania.

Enzym Group starts exporting pet food to three countries.

EBRD has provided a €40-million loan for the construction of a plant in Lithuania.

Dibrova K became the first agricultural company to purchase and implement an AI-enabled smart weeder from the Swiss company EcoRobotix.

1.3 AGROTECH STRENGTHS AND WEAKNESSES IN UKRAINE

THE EXISTING AGRO-INDUSTRIAL SECTOR OF UKRAINE IS A SOLID FOUNDATION FOR THE DEVELOPMENT AND IMPLEMENTATION OF UKRAINIAN AGROTECH SOLUTIONS

STRENGTHS OF UKRAINE FOR THE DEVELOPMENT OF THE AGROTECH SECTOR

- The AgroTech market has a wide potential for implementing solutions in Ukraine due to the developed agricultural and food industry sectors, as well as a large amount of arable land.
- AgroTech in Ukraine demonstrates a large number of ready-made solutions that are being implemented not only within Ukraine but also on a global scale.
- Ukraine current role as a global hub for agricultural raw materials can increase confidence in Ukrainian AgroTech solutions.
- Ukraine geographical location at the intersection of the main trade routes for agricultural products between Europe and Asia can help develop the export of AgroTech solutions.
- International programs of funding and grant support for Ukrainian agricultural producers can help to create demand for AgroTech solutions.
- Significant experience in the production of drones for military use, which can be used in the development of unmanned solutions for agriculture and the food industry.

AGRO-INDUSTRIAL PRODUCERS AMONG SMEs, REPRESENTING THE MAJORITY OF THE MARKET, ARE MOSTLY CLOSED TO THE IMPLEMENTATION OF AGROTECH

WEAKNESSES OF UKRAINE FOR THE DEVELOPMENT OF THE AGROTECH SECTOR

- The low culture of innovation among small and medium-sized agricultural producers due to conservative views on farming methods restrains the demand for AgroTech solutions.
- Insufficient scaling of available AgroTech solutions due to the limited financial capacity of small and medium-sized players in the agro-industrial sector.
- The ongoing economic and political instability caused by the full-scale war reduces the investment attractiveness of Ukrainian AgroTech startups.
- Lack of consumer demand for innovative food solutions due to low confidence in new technologies and uncompetitive prices compared to traditional products.
- The high level of competition in international markets such as North America and Europe, which are already saturated with innovative startups, creates obstacles to the development of Ukrainian companies.
- Ongoing problems with shadow land use and trade in agricultural products constrain the need for technology and limit domestic market opportunities.

1.4 BARRIERS AND OPPORTUNITIES TO BOOST AGROTECH DEVELOPMENT IN UKRAINE

THE AGROTECH SECTOR OF UKRAINE FACES A NUMBER OF THREATS TO THE DEVELOPMENT AND SCALING OF ITS INNOVATIVE IDEAS AND READY-MADE SOLUTIONS

OBSTACLES TO THE DEVELOPMENT OF THE TECHNOLOGY SECTOR IN UKRAINE

LACK OF TECHNOLOGY SKILLS

Lack of employees with appropriate technology skills and the ability to configure and control technology.

OUTDATED LEGISLATION

Complicated regulatory procedures for bringing innovative food products to the market and the lack of regulation of the use of technology by agricultural producers.

LIMITED ACCESS TO FUNDING

Lack of awareness of SMEs about opportunities and ways to obtain financing hinders their movement towards digitalization.

LACK OF INVESTOR CONFIDENCE

The lack of transparency and methods of controlling the use of funds discourage foreign investors from financing the technological development of agri-food SMEs.

LACK OF TESTING AREAS

AgroTech developers are forced to test their solutions at customer locations, which creates risks of financial and reputational losses.

THE LACK OF INTERACTION

The predominantly isolated work of agricultural producers hinders the effective exchange of experience in technological development and the implementation of joint projects.

IMPROVEMENT OF INFRASTRUCTURE AND REGULATION WILL EXPAND OPPORTUNITIES FOR THE DEVELOPMENT AND IMPLEMENTATION OF NEW AGROTECH SOLUTIONS

KEY OPPORTUNITIES TO PROMOTE THE DEVELOPMENT OF THE SECTOR

01

CREATING A REGULATORY AND LEGAL FRAMEWORK

- Developing a regulatory framework for the use of technology in the agricultural sector, with a focus on autonomous vehicles and precision farming technologies.
- Implementation of intellectual property protection mechanisms for AgroTech startups and their innovative solutions.
- Harmonization of Ukrainian legislation with EU norms in the field of agro-industrial and environmental innovations to ensure that Ukrainian products meet international requirements.

CREATING FINANCIAL OPPORTUNITIES

ESTABLISHING COOPERATION BETWEEN MARKET PLAYERS

02

CREATING INFRASTRUCTURE OPPORTUNITIES

- Launch a network of test grounds, including existing public and private ones, to test new and improve existing AgroTech solutions, as well as autonomous and robotic agricultural machinery
- Creating a national agro-innovation cluster with the involvement of AgroTech market stakeholders: startups and developers, as well as agricultural producers.
- Development of R&D centers at leading agricultural universities to facilitate the development of new technologies.

INCREASED STATE FOCUS ON AGROTECH AND COOPERATION BETWEEN MARKET PLAYERS WILL PROVIDE FINANCIAL AND TECHNICAL CONDITIONS FOR ITS DEVELOPMENT

KEY OPPORTUNITIES TO PROMOTE THE DEVELOPMENT OF THE SECTOR

DEVELOPING A REGULATORY FRAMEWORK

- Create government grant programs to support SMEs and startups in the AgroFoodTech industry, as well as ensure transparent conditions for receiving them.
- Attracting investment in the AgroFoodTech sector by developing cooperation between the state and business through public-private partnerships.

CREATING INFRASTRUCTURE OPPORTUNITIES

- Implementation of training and retraining programs for AgroFoodTech specialists in cooperation with higher education institutions, private training centers and vocational education institutions
- Implementation of joint projects in the field of AgroTech with international organizations and enterprises.

CREATING FINANCIAL OPPORTUNITIES

- Funding in the form of grants and loans for projects focusing on the processing of agricultural raw materials, restoration of degraded and mined fields.

ESTABLISHING COOPERATION BETWEEN MARKET PLAYERS

- Creating and implementing a strategy to promote Ukraine's agro-innovative brand in the international market through, among other things, organizing AgroFoodTech forums, attracting new partners and investors, etc.

2

KEY PROJECTS: AGROTECH

THE AGROTECH INDUSTRY STRATEGY ENVISAGES 6 PRIORITY AREAS AND IDENTIFIES 3 TOP PROJECTS FOR PRIORITY IMPLEMENTATION IN UKRAINE

PRIORITY AREAS

- AGROFOODTECH CENTER OF EXCELLENCE
- RESTORATION OF DEGRADED AND CONTAMINATED LAND
- IMPLEMENTATION OF TECHNOLOGIES FOR CLIMATE CHANGE ADAPTATION
- AUTOMATED HARVESTING SYSTEMS
- VERTICAL FARMING PRECISION FARMING

TOP PROJECTS

NATIONAL ONLINE PLATFORM FOR LAND USERS

DEVELOPMENT OF AGROTECH PARKS

DEEP PROCESSING OF AGRICULTURAL RAW MATERIALS

2.1 TECHNOLOGY DEVELOPMENT PRIORIES: AGROTECH

THE UKRAINIAN AGROTECH CENTER OF EXCELLENCE WILL, AMONG OTHER THINGS, HELP RESTORE SOIL FERTILITY USING MODERN TECHNOLOGIES

PRIORITY AREAS FOR TECHNOLOGY DEVELOPMENT

01 AGROFOODTECH CENTER OF EXCELLENCE

PROMOTE THE INTRODUCTION OF ADVANCED TECHNOLOGIES, THE DEVELOPMENT OF STARTUPS AND RESEARCH TO MODERNIZE THE AGRICULTURAL AND FOOD SECTORS

BENEFITS:

- Promote the development of joint R&D projects between the private and public sectors
- Incubate and support AgroTech and FoodTech startups to launch and scale technological solutions
- Promote the creation of AgroTech parks and innovation clusters

KEY ACTIONS:

- Evaluate and select sites for the center, equip the center with modern equipment for modeling, developing and testing technologies
- Implement IP protection mechanisms for AgroTech developers and technology startups
- Implement IP protection mechanisms for AgroTech developers and technology startups

02 RESTORATION OF DEGRADED AND CONTAMINATED LANDS

A SET OF MEASURES AIMED AT RESTORING TWO CATEGORIES OF LAND:

- **DEGRADED AND UNPRODUCTIVE ARABLE LAND** THAT HAS LOST ITS FERTILITY DUE TO EROSION AND DEPLETION
- **LAND CONTAMINATED AS A RESULT OF HOSTILITIES,** CONTAINING RESIDUES OF EXPLOSIVES, HEAVY METALS AND OTHER TOXIC ELEMENTS

BENEFITS:

- Soil restoration and aeration improves its biological activity, restores natural fertility, and increases crop yields
- Soil restoration increases the amount of productive agricultural land
- Land cleanup reduces the risk of groundwater contamination with toxic substances

KEY ACTIONS:

- Create a cadastre of degraded and contaminated lands to identify and monitor the condition and extent of damage to the territories
- Develop a national strategy for the development of a scientific base for promising soil remediation technologies, including phytoremediation
- Developing legislative norms to promote and sustainably use soil remediation technologies
- Prioritize state funding for projects that focus on restoring degraded land

THE IMPLEMENTATION OF TECHNOLOGIES WILL IMPROVE THE RESILIENCE OF UKRAINE'S AGRICULTURAL SECTOR TO CLIMATIC CONDITIONS AND CONTRIBUTE TO YIELD INCREASE

PRIORITY AREAS FOR TECHNOLOGY DEVELOPMENT

03 IMPLEMENTATION OF TECHNOLOGIES FOR CLIMATE CHANGE ADAPTATION

SENSOR TECHNOLOGIES AND SATELLITE IMAGES FOR CROP MONITORING, AUTOMATED IRRIGATION SYSTEMS, CROP ROTATION AND ADAPTIVE AGRICULTURE CROPS THAT ARE RESISTANT TO CLIMATE CONDITIONS

BENEFITS:

- The opportunity to respond in time to the needs of plants in abnormal climate conditions due to constant remote monitoring of crops
- The ability to take precautionary measures to protect crops thanks to AI solutions that can predict the change and impact of temperature conditions
- Reducing crop losses due to droughts, flooding, or premature ripening of agricultural crops

KEY ACTIONS::

- Conduct an analysis to categorize regions by the severity of climate change impact
- Create favorable lending conditions for the implementation of technologies by agricultural SMEs
- Facilitate the exchange of experience between agribusinesses in the area of climate change adaptation

04 AUTOMATED AND ROBOTIC HARVESTING SYSTEMS

ROBOTIC SYSTEMS AND EQUIPMENT EQUIPPED WITH AI, GPS, CAMERAS, SENSORS AND IOT TO AUTOMATE THE PROCESS OF HARVESTING AGRICULTURAL PRODUCTS

BENEFITS::

- Faster harvest, which is especially important during the short harvest season
- Reduced harvest losses due to precise harvesting at the best ripening stage and careful handling
- Reduced labor costs and dependence on manual labor

KEY ACTIONS:

- Create an agro-innovation cluster to develop automated solutions for agriculture
- Launch a network of test sites for testing automated agricultural machinery
- Provide state support and subsidies for farmers to purchase robotic systems
- Creating conditions for transparent and high-quality exchange of information on technologies, developing the market of technology providers for their distribution and scaling

DEVELOPMENT OF VERTICAL FARMS AND PRECISION FARMING WILL STRENGTHEN UKRAINE'S POSITION AS AN INNOVATIVE PLAYER IN THE GLOBAL MARKET

PRIORITY AREAS FOR TECHNOLOGY DEVELOPMENT

05 VERTICAL FARMING

A METHOD OF GROWING CROPS IN VERTICALLY STACKED LAYERS, USING ARTIFICIAL LIGHTING AND A CONTROLLED ENVIRONMENT

BENEFITS:

- It does not require sunlight and huge areas of land required for traditional farming
- It allows to grow agricultural crops in urban areas, reducing transportation costs and providing consumers with fresh products all year round
- It requires less water, fertilizers and pesticides, and does not depend on weather conditions

KEY ACTIONS::

- Provide financial support and preferential loan programs to farmers and agricultural producers for the construction of vertical farms and the purchase of necessary equipment
- Increase the availability of renewable energy sources for vertical farms
- Attract international experience through partnerships with companies that have already implemented vertical farms

06 PRECISION FARMING

USE OF ADVANCED TECHNOLOGIES, DATA AND ANALYTICS TO OPTIMIZE AND CONTROL THE PROCESSES OF GROWING AGRICULTURAL CROPS

BENEFITS:

- Mitigating the negative impact of agricultural production on the environment by optimizing the use of water and energy resources
- Increasing the level of agricultural production by improving the decision-making process, as well as the quality and accuracy of harvesting
- Accurate monitoring of soil and crop conditions

KEY ACTIONS::

- Expanding Internet coverage and creating digital maps of soils and agroclimatic zones with access to them for market participants
- Establish state R&D centers based on agricultural universities to develop AgroTech solutions
- Provide agricultural producers with grant programs to support the implementation of precision farming technologies

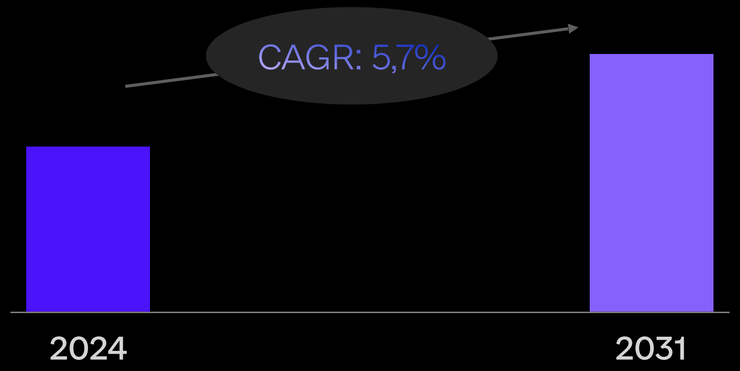
2.2

TOP PROJECTS: AGROTECH

TOP PROJECT 1 — NATIONAL ONLINE PLATFORM FOR LAND USERS

GLOBAL DEVELOPMENT OF THE LAND MANAGEMENT SOFTWARE SEGMENT

THE GLOBAL LAND MANAGEMENT SOFTWARE MARKET, USD BLN



The global land management software market is growing rapidly, driven by high demand for efficient land use, the need to implement sustainable development practices, advances in geospatial technologies and precision farming, and the emergence of integrated platforms.GIS dominates the land management software market due to its unique capabilities in managing, analyzing and visualizing spatial data.

Land management software is expected to continue to grow. In addition, regulatory requirements and governments' recognition of the importance of sustainable land management practices in addressing global issues such as food security, environmental impact, and climate change will drive the market.

SELECTED LAND MANAGEMENT SOFTWARE DEVELOPERS

- 🇺🇸 P2 ENERGY SOLUTIONS – PROVIDES TOOLS FOR LAND ASSET MANAGEMENT.
- 🇨🇦 PELOTON – SOFTWARE SOLUTIONS FOR LAND DATA MANAGEMENT.
- 🇺🇸 BITCO SOFTWARE – DEVELOPER OF WEB-BASED CORPORATE LAND MANAGEMENT SOFTWARE PERMITTRAX.
- 🇺🇸 TOTALAND TECHNOLOGIES – РОЗРОБНИК ДОДАТКУ ДЛЯ ЗЕМЛЕКОРИСТУВАЧІВ.

TOP PROJECT 1 — NATIONAL ONLINE PLATFORM FOR LAND USERS

DRIVERS OF GROWTH IN THE GLOBAL LAND MANAGEMENT SOFTWARE MARKET

DEMAND FOR EFFICIENT LAND USE

As the world's population grows and urbanization accelerates, the need for effective land management is growing. The software offers tools to optimize land use, increase productivity and ensure sustainable agricultural practices.

THE GROWING NEED FOR DATA-DRIVEN DECISION-MAKING

Land management software provides analytical tools for processing large volumes of spatial data, allowing for data-driven decision-making and climate-smart land management.

GLOBAL GROWTH DRIVERS

COMPLIANCE WITH REGULATORY REQUIREMENTS FOR SUSTAINABLE DEVELOPMENT

Compliance with regulatory requirements for sustainable development and sound land management practices, as well as growing awareness of climate change risks, are driving the adoption of land management software among government agencies, landowners, and businesses worldwide.

PROGRESS IN GEOSPATIAL TECHNOLOGIES

Improvements in geospatial technologies, such as GIS, remote sensing, and satellite data, have significantly expanded the capabilities of land management software, enabling more accurate mapping, monitoring, and analysis of land resources.

TOP PROJECT 1 — NATIONAL ONLINE PLATFORM FOR LAND USERS

ENABLING AND CONSTRAINING FACTORS FOR DEVELOPMENT IN UKRAINE

ENABLERS FOR DEVELOPMENT IN UKRAINE:

- The state land cadastre, whose open data can be integrated into the platform
- Ready-made AgroTech solutions are available, and their developers will become key participants in the online platform
- The current land reform in Ukraine requires technological solutions to optimize land management

CONSTRAINTS TO DEVELOPMENT IN UKRAINE

👉 INSUFFICIENT NETWORK COVERAGE

Limited access to high-speed Internet in rural areas, where most land users live, and insufficient level of digital device ownership among the Ukrainian population may lead to digital inequality among platform users and reduce the overall effect of its implementation.

👉 MILITARY ACTIONS AND POST-WAR THREATS

The need to demine land, the occupation of part of the territory, and the active conduct of hostilities in Ukraine complicate data collection. In addition, the high priority of other areas of recovery may delay the development of the platform.

👉 INCONSISTENCY BETWEEN STATE REGISTERS

Land data related to cadastre and property rights are distributed among several government agencies, so they may be duplicated or contradictory. The lack of data integration may complicate the development of the platform, as it will need to be synchronized with several databases.

👉 LACK OF DIGITAL CULTURE

Traditional farming methods, doubts about the reliability of electronic platforms, and farmers' reluctance to use digital tools may slow down the active adoption and effectiveness of the platform, especially in the first years after its launch.

TOP PROJECT 1 — NATIONAL ONLINE PLATFORM FOR LAND USERS

ASSESSMENT OF THE POSSIBILITY TO IMPLEMENT THE TOP PROJECT IN UKRAINE

REQUIRED ACTIONS

DEVELOP DIGITAL INFRASTRUCTURE

- Develop the concept of a state platform of open agricultural data based on cloud technologies
- Create an online map of agricultural land based on satellite data and laboratory analysis
- Develop a system of access to services and data of state sectoral structures for AgroTech and FoodTech stakeholders, especially SMEs that cannot buy such data, and R&D centers for use in developing innovations

RAISE AWARENESS OF THE NEED FOR SOIL RESTORATION AMONG AGRICULTURAL PRODUCERS

- Create a database of soil fertility restoration and precision farming technologies
- Provide free access to the database of representatives of the agricultural and AgroFoodTech sectors
- Develop incentives to attract the private sector to update data in the online platform

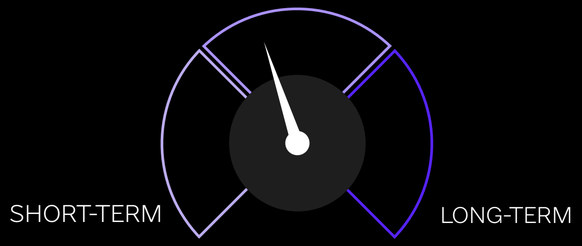
PROVIDE AN OPPORTUNITY TO ORDER EQUIPMENT AND SOFTWARE FOR PRECISION FARMING

- Create forms for registration of orders by agricultural producers of AgroTech solutions from developers
- State lending for the implementation of precision farming technologies

EXPECTED DURATION OF THE TOP PROJECT

Medium-term

3-5 YEARS



EXPECTED EFFECT

- ✓ Creating a digital agricultural database and online map of mined and unmined areas, soil contamination levels, current soil conditions and their agrochemical and microbiological properties
- ✓ Accelerating the search for technologies by agricultural companies in line with their goals
- ✓ Ensuring conditions for reasonable cultivation of agricultural crops in accordance with soil conditions and taking into account the principles of sustainable agricultural production

TOP PROJECT 2 — AGROTECH PARKS DEVELOPMENT

DEVELOPMENT OF AGROTECH PARKS IN THE GLOBAL MARKET

NUMBER OF SCIENCE PARKS AND INNOVATION ZONES WORLDWIDE

2010 2014 2018 2023

124

OF 329

members of the International Association of Science Parks and Innovation Zones (IASP) are conducting research in the field of AgriFood as of the beginning of 2025.

Science parks and innovation zones play a key role in the innovative development of countries around the world, as they bring together universities, research institutions, established companies, and promising STARTUPS.

ECOSYSTEM OF SPECIALIZED AGRIFOOD PARKS IN THE WORL INCLUDES:

- Agricultural industry - infrastructure for deep processing of agricultural raw materials and creation of value-added products
- Testing zones where AgroTech developers can test their innovations and farmers can implement solutions
- R&D zones - laboratories and infrastructure for searching innovations

EXAMPLES OF SPECIALIZED AGROFOOD PARKS GLOBALLY

AGRO FOOD PARK
- Operates since 2009 More than 85 companies and startups

🇩🇰 DENMARK

AGRICO
- Operates since 2017
- 28 companies-residents

🇨🇭 SWITZERLAND

AGRIFOOD INNOVATION PARK
- Announcing an 18-hectare park in 2019

🇸🇬 SINGAPORE

TOP PROJECT 2 — AGROTECH PARKS DEVELOPMENT

GROWTH DRIVERS OF AGROTECH PARKS IN THE GLOBAL MARKET

GLOBAL GROWTH DRIVERS

POPULATION GROWTH AND URBANIZATION

According to UN estimates, the world's population will reach almost 10 billion by 2050, 68% of which will be concentrated in cities, which stimulates the need to find new innovative solutions for the agricultural industry.

INCREASED ROLE OF CIRCULAR ECONOMY PRINCIPLES

AgroFood parks often provide waste-free production from agricultural raw materials to processing of agricultural waste, which contributes to the achievement of sustainable development goals, which are becoming critically important.

GROWING COMPETITION AND GLOBALIZATION

Due to the high competition in the global market, innovative STARTUPS face difficulties in scaling up. AgroFood parks provide development assistance and ensure cooperation between agro-industrial market players.

THE NEED TO FINANCE INNOVATION

AgroFood parks receive significant government support in the form of tax incentives for resident startups in advanced countries, and also attract international investors by facilitating access to finance.

TOP PROJECT 2 — AGROTECH PARKS DEVELOPMENT

ENABLING AND CONSTRAINING FACTORS FOR DEVELOPMENT IN UKRAINE

ENABLERS FOR DEVELOPMENT IN UKRAINE:

- A strong base of innovative AgroTech startups that may be interested in developing within the AgroFood Park
- Favorable geographical location for integration into global supply chains and development of cross-border cooperation
- A large number of agricultural zones that can become the basis for the development of AgroFood infrastructure

CONSTRAINTS TO DEVELOPMENT IN UKRAINE

👉 INSUFFICIENT FINANCIAL SUPPORT

The lack of targeted government programs for the development of AgroTech through grants and loans, as well as a weak venture capital market, may limit the development of startups within AgroFood parks.

👉 LACK OF QUALIFIED FOOD TECHNOLOGISTS

Over the past decade, the number of employees in all areas of activity involved in R&D in Ukraine has decreased by 67.6%. The lack of qualified personnel may hinder the active operation of AgroFood parks and require additional time for training programs.

👉 LOW LEVEL OF PRIVATE INVESTMENT

According to the latest available data, as of 2020, the share of R&D expenditures by food companies was only 0.1%, which may indicate that private companies are not ready to allocate funds for new AgroFood solutions.

👉 IMPERFECTION OF THE LEGISLATIVE FRAMEWORK

Complicated bureaucratic procedures for obtaining permits and complicated regulation of agricultural land use hinder the development of innovative AgroTech infrastructure and innovation testing zones.

TOP PROJECT 2 — AGROTECH PARKS DEVELOPMENT

ASSESSMENT OF THE POSSIBILITY TO IMPLEMENT THE TOP PROJECT IN UKRAINE

REQUIRED ACTIONS

ENSURING A FAVORABLE LEGAL ENVIRONMENT

- Improve IP protection mechanisms
- Create a special legal category for AgroTech companies in Diia.City
- Development of a legislative framework for the use of the lands of the National Academy of Sciences of Ukraine and lands subordinated to the Ministry of Agrarian Policy and Food of Ukraine for the purposes of AgroFoodTech parks

DEVELOPMENT OF INDUSTRY COOPERATION

- Establish cooperation with HEI to train AgroTech specialists
- Hold international forums to attract partners and investments in the park's development
- Creating joint educational projects with the private sector

INCREASED STATE SUPPORT

- Develop public-private partnerships in the area of feed technology and food innovations
- Launch grant programs to support startups and SMEs in the field of AgroFoodTech

EXPECTED DURATION OF THE TOP PROJECT

Mid-term

3-5 YEARS

EXPECTED EFFECT

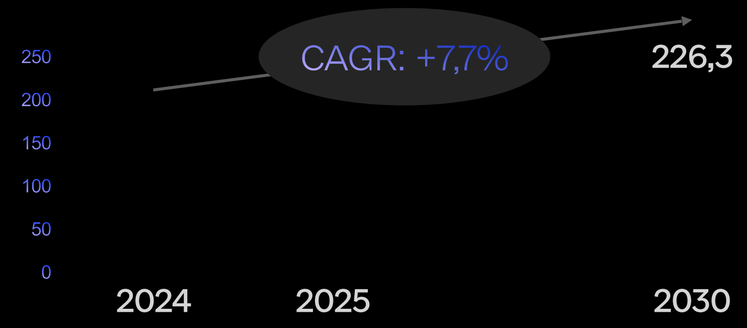
- ✓ Availability of test areas for testing autonomous vehicles and new AgroTech solutions
- ✓ Reducing the costs of AgroTech players for the development of innovations through the implementation of joint projects and the availability of a ready-made R&D infrastructure
- ✓ Scaling of ready-made AGROTECH SOLUTIONS through cooperation of technology developers and farmers within AgroFood Park

TOP PROJECT 3 — DEEP PROCESSING OF AGRICULTURAL RAW MATERIALS

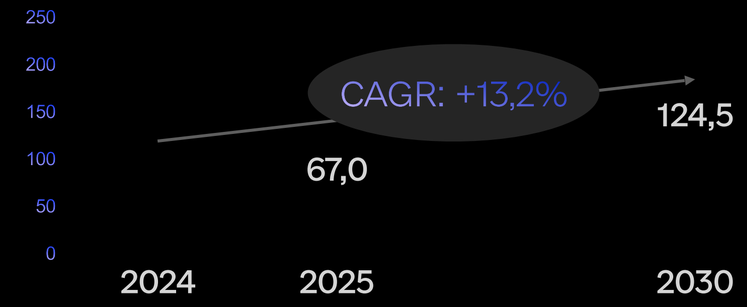
DEVELOPMENT OF THE DEEP AGROPROCESSING SEGMENT IN THE GLOBAL MARKET

THE SIZE OF THE GLOBAL MARKETS FOR DEEP PROCESSING PRODUCTS, USD BLN

BIOENERGY



BIOETHANOL



Deep processing of agricultural raw materials increases the added value of the agricultural sector, increases domestic demand for agricultural raw materials, and helps overcome a number of environmental challenges.

Bioenergy (biomass, biogas, biofuels) and bioethanol are among the most promising areas of in-depth processing. About 14% of the world's agricultural waste was expected to be used for bioenergy production in 2023.

ADDED VALUE OF IN-DEPTH PROCESSING ON THE EXAMPLE OF THE EU, 2022

AVERAGE PRICE OF GRAIN CROPS	AVERAGE PRICE OF BIOETHANOL
$270-400 PER 1 TON	$1 264 PER 1 TON

n addition, almost 10% of bioethanol in the EU is produced from Ukrainian corn.

EXAMPLES OF COMPANIES ENGAGED IN DEEP PROCESSING

- 🇺🇸 ADM – production of biodiesel from vegetable oils.
- 🇩🇪 CropEnergies – bioethanol from grain crops.
- 🇬🇧 Farm Energy – producer of biogas from organic waste.
- 🇺🇸 Brightmark Energy – biogas from livestock waste.
- 🇭🇺 Pannonia Ethanol – producer of bioethanol and corn oil.
- 🇫🇷 Tereos – processing beets and corn into biofuels.

TOP PROJECT 3 — DEEP PROCESSING OF AGRICULTURAL RAW MATERIALS

GROWTH DRIVERS FOR DEEP PROCESSING IN GLOBAL MARKET

GLOBAL GROWTH DRIVERS

GROWING DEMAND FOR RENEWABLE ENERGY

A number of leading countries plan to become climate-neutral by 2050, which is driving demand for renewable energy. According to IEA estimates, the share of renewable energy globally will reach 20% by 2030.

TECHNOLOGICAL DEVELOPMENT

Improvements in deep processing technologies, such as fermentation, hydrothermal treatment, etc., allow for more efficient and cost-effective processing of agricultural raw materials.

INCREASED REGULATORY REQUIREMENTSГ

The European Commission has set a target of 14% renewable energy in the transportation system by 2030, and the US and Canadian governments mandate the use of gasoline with a minimum 10% bioethanol content.

INCREASED IMPORTANCE OF LOCAL MARKETS

Deep processing contributes to the development of local farmers by creating an additional market for agricultural raw materials. In addition, new jobs help to strengthen the local economy.

TOP PROJECT 3 — DEEP PROCESSING OF AGRICULTURAL RAW MATERIALS

ENABLING AND CONSTRAINING FACTORS FOR DEVELOPMENT IN UKRAINE

ENABLERS FOR DEVELOPMENT IN UKRAINE:

- Surplus of agricultural raw materials in Ukraine, which is the basis for deep processing
- Access to EU programs, such as Horizon Europe, which provide financial support and stimulate innovation
- A mandatory share of bioethanol in motor gasoline of at least 5% from June 1, 2025

CONSTRAINTS TO DEVELOPMENT IN UKRAINE

HIGH COSTS OF STARTING A BUSINESS

Significant investments in technologies and equipment for in-depth processing of agricultural raw materials may deter companies in Ukraine from developing the industry, especially in the face of economic uncertainty.

LIMITED CAPABILITIES OF SME

Insufficient number of preferential loans and grants for SMEs for the development of deep processing technologies, as well as their low level of cooperation with specialized enterprises for the supply of agricultural raw materials.

SUSPENSION OF THE EU DUTY-FREE QUOTA

In 2023, the logistical threats of a full-scale war led to the suspension of the duty-free export quota for bioethanol to the EU of up to 100,000 tons per year, which reduces the competitiveness of Ukrainian products.

DIFFICULTIES WITH CERTIFICATION

To export deep processing products to the EU, Ukrainian companies must comply with the EU Renewable Energy Directive standards and have their biofuels and bioethanol certified by the relevant organizations.

TOP PROJECT 3 — DEEP PROCESSING OF AGRICULTURAL RAW MATERIALS

ASSESSMENT OF THE POSSIBILITY TO IMPLEMENT THE TOP PROJECT IN UKRAINE

REQUIRED ACTIONS

SUPPORT FROM THE REGULATORY AUTHORITIES

- Reduce administrative barriers (licensing conditions) for enterprises of deep processing of agricultural raw materials
- Harmonize legislation with EU standards

DEVELOPMENT OF TECHNOLOGICAL SKILLS

- Launch of educational programs to raise awareness of deep processing
- Conduct environmental awareness campaigns

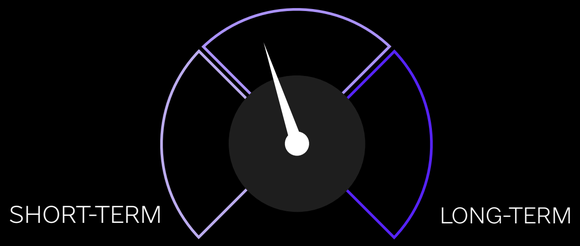
PRIORITIZE FUNDING FOR DEEP PROCESSING

- Provide loans and grants to launch biofuel and bioethanol production
- Provide economic risk insurance for investors in deep agro-processing

EXPECTED DURATION OF THE TOP PROJECT

Mid-term

3-5 YEARS



EXPECTED EFFECT

- ✓ Development of a domestic market for SMEs, contributing to the stabilization of agricultural raw materials prices and reducing the export burden of low value-added products
- ✓ Increased value added in the agricultural sector
- ✓ Increased investment attractiveness of Ukraine for foreign investors, in particular from the EU, due to the development of environmental solutions