USAID
FROM THE AMERICAN PEOPLE

USAID
FINANCIAL SECTOR TRANSFORMATION PROJECT

PROSPECTS OF USING DERIVATIVES IN THE GRAIN MARKET OF UKRAINE

GRAIN MARKET RESEARCH

April 2020
Kyiv, Ukraine



USAID FROM THE AMERICAN PEOPLE

USAID FINANCIAL SECTOR TRANSFORMATION PROJECT

PROSPECTS OF USING DERIVATIVES IN THE GRAIN MARKET OF UKRAINE

GRAIN MARKET RESEARCH

April 2020

This report is made possible by support of the American people through the United States Agency for International Development (USAID). The contents of this report are the sole responsibility of the USAID Financial Sector Transformation Project, being implemented by DAI Global LLC. The opinions expressed do not necessarily reflect the views of USAID or the United States Government.

DISCLAIMER

The Prospects of Using Derivatives in the Grain Market of Ukraine Report was prepared by consultants and experts of DAI Global LLC, a contractor under the USAID Financial Sector Transformation Project. Neither DAI nor its experts accept any liability or responsibility to any third party for this report or for any actions or decisions taken as a result of research or recommendations contained herein. This report does not constitute investment advice or guidance, legal advice or opinion.

All links to web resources are effective as of 01/02/2020.

TABLE OF CONTENTS

PREFACE

The Ukrainian grain market meets consumption needs not only domestically, but also internationally. Ukraine is a key player in the international grain market, increasing its production and exports every year.

Furthermore, an upward trend in production output continues, while demand is growing fast across world markets. With additional funding by farmers of innovative production and cultivation technologies, Ukraine may expect to see a positive trend of increased production and grain exports.

Globalization has made national markets more open. Today, domestic pricing processes are deeply interlinked with pricing on international platforms. World grain prices are formed on the leading international commodity exchanges, the most prominent of which include CME Group, a Chicago-based exchange, and MATIF, a French exchange.

Grain price fluctuations and crop seasonality represent major risks for Ukrainian farmers. These are exacerbated by asymmetry of price information, infrastructure constraints and other shortcomings identified in this study. The Ukrainian grain market participants currently remain exposed to risks specific to the agricultural sector. This mostly concerns small and medium-sized farms that are primary producers of grain.

International practice shows that hedging remains an effective risk management tool. At present, however, there is no possibility to hedge risks in Ukraine because there is no trading in futures and options on agricultural products and no transparent grain pricing.

Section 1 reviews the current state of Ukraine's grain market, its key participants and their interests, and examines the physical infrastructure for the grain market. Based on a survey of producers, traders, and processors, we evaluate how the market operates. A detailed description of the grain export and domestic pricing mechanism is provided.

Section 2 analyzes risks in Ukraine's agricultural sector and how they are managed currently. We investigate risk awareness by Ukrainian agricultural market participants and we examine various risk management strategies. We explore the interest of market participants to use derivatives to hedge risks, and offer examples of grain price and crop volatility.

Section 3 provides an overview of international experience in managing agricultural derivatives trading. Both the success and failure stories of the countries from the regions of Central and Eastern Europe, Central Asia, the BRIC countries, South Africa, Mexico, and the USA are discussed. We analyze common factors behind the successful introduction of national commodity exchanges in some countries and unresolved problems faced by others.

Section 4 summarizes the survey findings and discusses whether agricultural commodity risks are better hedged on international exchanges or on a local derivatives market. In conclusion, an analysis is given of the required changes to Ukraine's financial infrastructure in order to develop a derivatives market.

ABOUT THE SURVEY

This research report is based on a nationwide survey on the prospects of using derivatives in the grain and oilseed market, commissioned by the USAID Financial Sector Transformation Project and conducted in August and September 2019 by UkrAgroConsult in collaboration with the New Image Marketing Group.

The key goal of the survey was to identify factors that have an impact on the demand for and the use of hedging instruments by the Ukrainian grain market participants. The report was also to provide recommendations on expanding the use of derivatives in the Ukrainian grain market and on the necessary actions by stakeholders, including government authorities, grain market participants, agricultural producers, investors, etc.

We also hope the survey findings will contribute to a more effective dialogue, focused on the agricultural sector development, between the Ukrainian grain market participants and government agencies.

The survey covered 570 grain market participants from among agricultural producers, traders, and grain and oilseed processors from all Ukrainian regions, except the Joint Forces Operation zone in the Donetsk and Luhansk Oblasts and the temporarily occupied territory of Crimea. The questions concerned such aspects as business processes, price information, and the use of derivatives to hedge risks. The main goal of the survey was to perform an unbiased analysis of the factors that constrain the development of derivatives, demand and use of these instruments by the Ukrainian grain market participants.

The sample included 75% of agricultural producers, 15% of traders and 10% of grain processors, which generally reflects the market's organizational structure. The regional breakdown was as follows: Northern Ukraine — 20.7%, Southern Ukraine — 17.7%, Western Ukraine — 20.7%, Eastern Ukraine — 15.6%, Central Ukraine — 25.3%. In terms of size, the survey included small farms (up to 500 hectares) at 23%, medium farms (500 to 2,000 hectares) at 57.4%, large farms (more than 2,000 hectares) at 16.3%, and agricultural holding companies at 3.3%.

The survey assessed: i) general awareness and use by the grain market participants of financial instruments that make it possible to minimize price risks and differences between various target groups in these matters; ii) the reasons for selling/buying produce during certain periods; iii) the degree of concern with various risks during production activities; iv) the interest in using derivatives to hedge prices; v) attitude to the functions of derivatives; vi) the interest in gaining extra knowledge in the matters of holding financial instruments that reduce price risks when selling agricultural produce.

The survey is a key part of this research, complementing the desk study and the review of international experience. In each section, detailed survey findings are provided, their interconnections analyzed, and optional development of risk hedging instruments, suitable for agricultural market participants, reviewed.

ACRONYMS

FOB	“Free on Board” is an international trade term in which the seller is required to deliver the goods to the port and load them on the ship specified by the buyer; the costs of delivering the goods on board the ship are borne by the seller.
EXW	“Ex Works” is an international trade term in which the seller’s responsibility ends upon making the goods available to the buyer or its carrier at the seller’s place of business (factory, warehouse, etc.). The seller is not responsible for loading the goods on a transport vehicle, and the buyer bears all the logistics costs.
CPT	CPT stands for Carriage Paid To and is an international trade term which means that the seller delivers the goods at their expense to a carrier or another person nominated by the seller.
FCA	FCA – Free Carrier. This term means that the seller delivers the goods, cleared for export, to the carrier nominated by the buyer at the named place. Seller pays for carriage to the named place.
CBOT	Chicago Mercantile Exchange, CME Group
MATIF	Marché à terme international de France
KCBT	Kansas City Board of Trade
EURONEXT	Pan-European stock exchange
CCP	Central Counterparty
CSD	Central Securities Depository
EMIR	European Market Infrastructure Regulation
MiFIDII	Markets in Financial Instruments Directive II
CSDR	Central Securities Depository Regulation
USDA	United States Department of Agriculture
UNTCAD	United Nations Conference on Trade and Development
UX	Ukrainian Exchange
ICE	International Commodity Exchange
NYMEX	New York Mercantile Exchange
B3	Brasil Bolsa Balcão S.A.
JSE	Johannesburg Stock Exchange
MCX	Multi Commodity Exchange of India

RECOMMENDATIONS

Ukraine is a key player in the international grain market, increasing its production and exports every year. In the 2018/2019 marketing year, Ukraine accounted for 8–10% of world wheat exports, 15–18% of corn and about 15% of barley exports. It is estimated that about 12.41% of Ukraine's GDP came from grain production in 2018.

There is a significant potential for further growth, especially from increased demand for grain. The Ukrainian grain market is capable of satisfying this demand through higher yield (in 2018, the wheat yield was 3.84 t/ha, the 2019 estimates are 4.2 t/ha) and areas under crops.

The Ukrainian agricultural market participants are well aware of the risks of their business, especially weather, logistics, and commodity prices. However, assessing potential losses or lost revenue is often difficult for farmers.

The main risks for Ukrainian farmers are yield risk and price (market) risk. Price risk is the source of highest concern for about 56% of Ukrainian grain producers, 23% of traders and 37% of processors. At the same time, 65% of producers are worried about the yield risk from unstable weather and climate. A study by UkrAgroConsult shows that grain price volatility in 2019 (the first ten months of 2019) was about 9.4% (FOB). Because of these price fluctuations, profits of market participants are neither stable nor predictable.

Without accessible risk management techniques, Ukrainian farmers:

- remain vulnerable to unexpected changes in product prices and to crop failures
- have insufficient access to up-to-date information about prices for their own produce
- face limitations of grain (silos, warehouses) and transport infrastructure
- lack access to instruments for the mitigation of major risks

In this research, we concentrate on risk hedging practices through the use of financial instruments, including futures and options. Among other things, the Ukrainian grain market participants expect that the introduction of legislative amendments to enable comprehensive regulation of derivative contracts will result in: i) the use of derivatives to hedge adverse changes in grain prices; ii) greater price discovery for grain in Ukraine; iii) the enforcement of executed contracts and lower counterparty risk; iv) a transparent and liquid market of financial instruments, with the same rules for all; and v) additional hedging of any associated (currency, weather, etc.) risks.

Based on the results of this research, we offer the following conclusions and recommendations:

1 *Recommendation 1: Pass legislation and introduce regulation for organizing and trading in commodity derivatives in Ukraine.*

According to the survey, 40% of manufacturers are afraid to violate the law by using derivatives. To alleviate these fears, it is necessary to introduce laws that are as clear and transparent as possible. In particular, these laws should clearly define derivative contracts, their turnover, requirements for the commodity derivatives exchange, and tax accounting rules. In order to bolster confidence that derivative contracts will be settled, close-out netting and settlement finality mechanisms should be implemented. Furthermore, the operation of the central counterparty and trade repository must be regulated by law to provide the financial infrastructure required for trading in derivatives.

The Verkhovna Rada has registered Bill 2284, *On Amending Certain Laws of Ukraine Regarding the Simplification of Raising Investments and Introduction of New Financial Instruments*, which, if passed, would address these matters comprehensively. In addition, tax laws should be amended.

2 *Recommendation 2: In Ukraine, trading in commodity derivatives should be initially concentrated on a dedicated platform.*

Competition among numerous trading platforms is not conducive to the formation of a liquid market. Almost universally, whenever a successful market is established in a developing country, trade gets concentrated across a limited number of trading platforms. If several exchanges operate in a country (e.g., in China), each of them becomes specialized. Promoting competition among exchanges on the national market also harms

liquidity, because national exchanges de facto operate in the competitive environment of the global market. Thus, both the government policy and actions by other stakeholders must focus on setting up a single centralized market whose operation should be in the best interest of all stakeholders.

Active trading on a single platform would advance the development of a price benchmark, thus reducing the asymmetry of price information between different groups of market participants, supporting the reduction in profit shifting, shaping and managing the market participants' expectations through futures prices.

3 *Recommendation 3: Create the necessary logistics infrastructure for storage, supply, and quality control of grain as an underlying commodity.*

Setting up a successful derivatives market for agricultural produce is generally accompanied by putting in place and developing the associated infrastructure, such as a network of certified warehouses, a quality control system, supply channels, and modern product standardization techniques. Meanwhile, creating an infrastructure for rapid flow of electronic warehouse receipts would significantly facilitate the introduction of the deliverable derivatives market.

For the derivatives market to be launched, adequate storage and transportation conditions for grain as an underlying commodity should be arranged to support its subsequent deliveries. Silos, warehouse receipts, transport logistics are key components in ensuring appropriate quality of grain that should conform to the commodity classes referred to in derivative contract specifications.

4 *Recommendation 4: Set up the necessary financial infrastructure in Ukraine to enable trading in commodity derivatives.*

The NSSMC and NBU should facilitate the technical and functional capacity of the financial market infrastructure to conduct transactions. This applies to organized spot trades in underlying commodities and in underlying commodity derivatives on the terminal market. An efficient financial market infrastructure must contain pre-trade, trade and post-trade components. Critical aspects include but are not limited to the introduction of trade settlements via a central counterparty, standardized data exchange, the ability to settle in a DVP (delivery versus payment) format with direct or indirect access to RTGS (real-time gross settlement), setting up a trade repository to generate a database of all transactions, and establishing regulators to mitigate price manipulation risks.

At the same time, the NSSMC's institutional independence and conformity of its powers to the IOSCO principles is essential for proper oversight of the derivatives markets and cross-border cooperation.

5 *Recommendation 5: Risk hedging costs to market participants should be easily understood, assessed, and kept low*

To assess the effect of the price risk management, the agricultural market participants must be aware of the price of executing a derivative contract (the so-called "premium") in Ukraine compared to any potential losses that they may be incurred if risks materialize.

The cost of hedging to buyers of derivatives should be further investigated. The price of the contract depends on liquidity of the exchange, the instrument, the cost of services provided by banks or investment broker companies, administrative cost of the central depository services and of clearing through the central clearing counterparty (monthly fees and commission fees for each transaction), etc.

The optimal solution would be for the Ukrainian banks, investment companies or the Ukrainian stock exchange to create a calculator of risk hedging cost, i.e., the price to be paid for buying or selling a derivative.

6 *Recommendation 6: Launch a comprehensive educational program for the Ukrainian grain market participants to train them in using risk hedging instruments.*

This program should cover grain producers, traders and processors, including small and medium-sized market participants, in order to create equally accessible hedging opportunities. The program should provide clear explanations in response to the concerns associated with the use of derivatives, a review of actual cases, and assessment of revenue lost or losses incurred as a result of the lack of hedging.

Only 9% of all surveyed farmers understand what derivatives and hedging are. By contrast, the percentage of awareness among traders or processors is 40% and 33%, respectively. The intensity of the program should thus be adjusted for the relevant types of participants.

7 *Recommendation 7: Introduce a national program for the development of derivative contracts.*

The Government should consider stimulating the involvement of various categories of participants in transactions and make it clear that the Government provides support to develop this market.

Two approaches could be taken here: (1) facilitate the access to international markets for hedgers; or (2) set up a national derivatives market.

Stakeholders under both approaches include: (a) agricultural producers; (b) traders; (c) processors; (d) commodity exchange; (e) Ministry of Economic Development, Trade and Agriculture; (f) the NSSMC; (g) the NBU; (h) banks; (i) industry associations; other financial market participants.

Experience of some countries (USA, Mexico) suggests a positive effect of government programs intended to support hedging transactions by producers and processors on the derivatives market. For example, financing from a government-sponsored fund to purchase put or call options might contribute to the development of a liquid market and is a more efficient way of protecting market participants against market risks, compared to the direct "buffer" transactions with the state commodity reserves or other ways of supporting the producers directly.

8 *Recommendation 8: In addition to launching a local commodity exchange in Ukraine, opportunities must be provided for easy and cheap access by the Ukrainian agricultural market participants to international derivatives markets.*

There are a number of constraints that prevent a wide use of direct hedging on international platforms. Among them is transfer of a maintenance margin to the broker's accounts at an international exchange by the parties to derivative contracts — a rather complicated process for Ukrainian farmers. Besides, Ukraine lacks taxation practices for hedging transactions carried out on global markets.

9 *Recommendation 9: Engage the banking system in the development of market-maker institutions and the support for liquidity of commodity derivatives in Ukraine, as well as in shaping the demand for derivatives among the banks' own farmer customers.*

Having a sufficient number of financially strong and competent market makers would create the basis for market liquidity. An opportunity to make a profit as a result of their activities, as well as financial and operational incentives and privileges granted by the exchange, would motivate the market makers to actively participate in the market. It is necessary to have many market players involved not only in hedging, but also in arbitrage transactions.

South Africa's success story demonstrates a significant stimulating role of banks in the development of the derivatives market: banks help producers to properly structure their price risk management solutions by offering derivatives market-specific solutions for funding and supporting transactions on the commodity market. In Ukraine, major market makers could initially be banks with Western capital, which have access to the expertise and to hedging their own positions via parent structures, as well as state-owned banks.

As South Africa's practice shows, engaging the banking sector in a dialogue about developing integrated solutions for its customers — agro-industrial sector participants — would bolster the farmers' confidence in the market. Furthermore, banks, as professional players in the stock and currency markets, can act as dealers for their clients and hedge their clients' price risk and, potentially, the currency risk as part of a single package. Setting up a liquid derivatives market would encourage banks to provide more services to their customers at lower prices.

SECTION 1. CURRENT STATE OF GRAIN MARKET IN UKRAINE

UKRAINE'S GRAIN MARKET SIZE

PRODUCTION

During the period from 2014 through 2018, the average crop harvested by farmers reached 63 million tons. In the 2018/2019 marketing year, harvest was a record high at 70 million tons. The average production was higher than the one observed during the period from 2004 through 2008 at 37 million tons, with a record 49.2 million tons in 2008.

TABLE 1. GRAIN PRODUCTION IN UKRAINE, '000 TONS[1]

	2011	2012	2013	2014	2015	2016	2017	2018	2019
wheat	16,851	22,324	15,763	22,279	24,114	26,532	26,043	26,157	24,606
barley	8,485	9,098	6,936	7,562	9,046	8,288	9,436	8,285	7,349
corn	11,953	22,838	20,961	30,950	28,497	23,328	28,075	24,669	35,801
total grain	39,271	56,747	46,216	63,859	60,126	60,126	66,088	61,917	70,057

Source: State Statistics Service of Ukraine

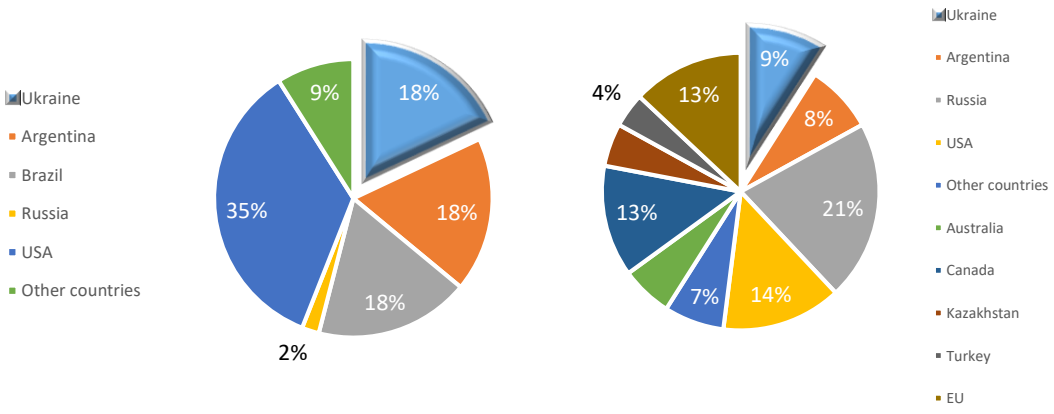
The key factors in stimulating grain production included favorable weather conditions and yield growth. The latter is associated with upgraded cultivation technology, machinery, seeds, fertilizers, as well as with the application of modern plant protection products.

The primary crops in Ukraine are wheat, corn, and barley, whose share in the overall grain production structure was approximately 97% as of 2018[2].

EXPORT

Ukraine accounts for 3–4% of the global wheat and barley production; the country, however, plays an important role in world exports. As of the 2018/2019 marketing year, Ukraine accounts for 8–10% of the world's wheat exports, 15–18% of corn and about 15% of barley exports[3].

CHART 1. UKRAINE'S SHARE IN GLOBAL CORN AND WHEAT EXPORTS IN THE 2018/2019 SEASON



Source: USDA

In the 2018/19 marketing year, Ukraine exported about 50.16 million tons of grain compared to the average 29 million tons over the previous decade.

[1] (Preliminary) data of the State Statistics Service of Ukraine for 2011–2019, available at http://www.ukrstat.gov.ua/operativ/operativ2017/sg/pvzu/arch_pvxu.htm. Since 2014, the data has not included the territory of the occupied Crimea and a part of Donbas (the Joint Forces Operation zone).
[2] State Statistics Service of Ukraine. http://ukrstat.gov.ua/ Area, gross harvest and yield of agricultural crops in 2018, broken down by type and region
[3] USDA (the U.S. Department of Agriculture) https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery

TABLE 2. GRAIN EXPORTS FROM UKRAINE, '000 TONS[4]

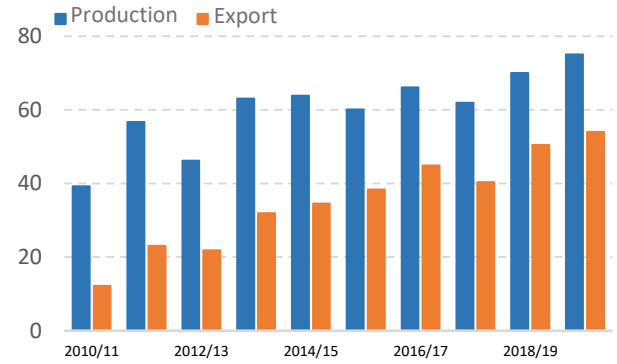
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
wheat	4,166	5,221	6,918	9,410	10,883	17,406	17,531	17,153	15,579
barley	2,794	2,457	2,134	2,476	4,454	4,411	5,355	4,289	3,560
corn	5,091	13,678	13,599	20,133	18,835	16,927	20,702	17,770	29,828
total grain	12,198	23,131	21,857	31,960	34,567	38,407	44,878	40,413	50,160

Source: The State Statistics Service of Ukraine

There is a potential for further expansion of grain production and exports in Ukraine. The global trend of population growth in developing countries shows that the demand for cheap grain, including that of Ukrainian *origin, will increase. Competitiveness of Ukrainian grain is ensured by its high quality for acceptable prices and its availability in large batches.*

As of 2018, areas under crop in Ukraine covered 27.7 million hectares[6], with 14.8 million allocated to grain crops[7]. In the 2019/2020 marketing year, an increase in total grain yield is expected due to larger areas under crop at 15.3 million hectares (+3%)[8] and favorable weather conditions for primary crops.

CHART 2. GRAIN PRODUCTION AND EXPORT IN UKRAINE, MLN T



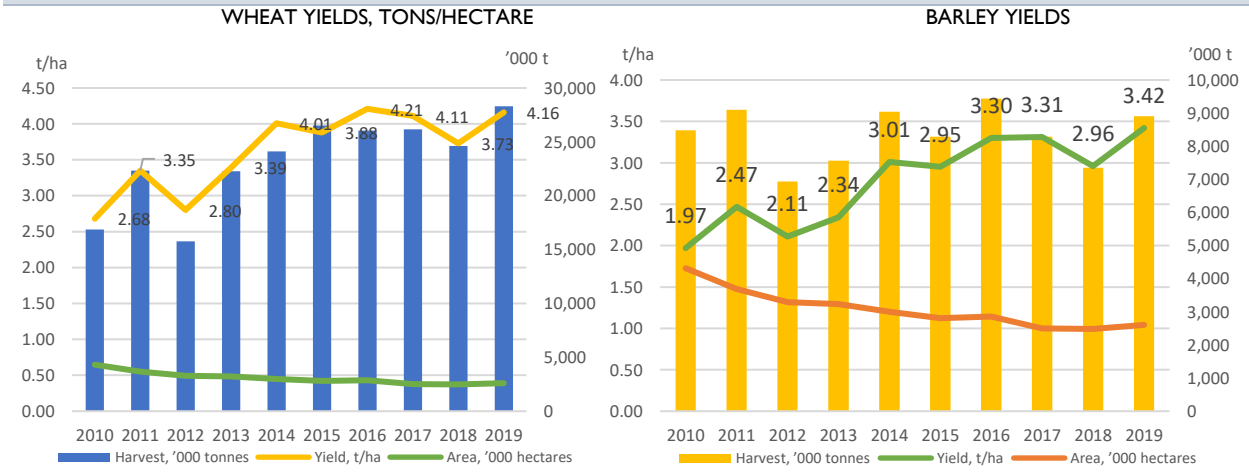
Source: The State Statistics Service of Ukraine[5]

PRIMARY CROP YIELDS

Compared to 2018, areas under winter wheat and barley increased in 2019[9]. This is due to the higher market prices, profitability of primary crops and favorable weather conditions during the sowing season.

Barley is gradually becoming a small-farm crop with its cultivated area shrinking since 2010. Barley production remains at 8 million tons. In the 2019/20 marketing year, areas under barley increased due to price hikes in 2018 — occasionally exceeding even the milling wheat prices.

CHART 3. WHEAT AND BARLEY YIELDS IN UKRAINE[10]



Source: State Statistics Service of Ukraine

[4] http://www.ukrstat.gov.ua/operativ/operativ2019/zd/e_iovt/arh_iovt2019.htm —State Statistics Service. The marketing year (July to June) data. The calculation method is as follows: for example, the marketing year is 2016–2017. The data for the entire year of 2016 (January to December) is taken, the January–June (2016) data is subtracted, and the January–June data for the following year (2017) is added

[5] State Statistics Service of Ukraine. http://ukrstat.gov.ua/ Area, gross harvest and yield of agricultural crops, broken down by type and region; http://www.ukrstat.gov.ua/operativ/operativ2019/zd/e_iovt/arh_iovt2019.htm — Foreign economic activity, foreign trade in certain commodities, broken down by country and type of goods.

[6] http://www.ukrstat.gov.ua/druk/publicat/kat_u/2019/zb/09/Zb_sg_2018%20.pdf

[7] State Statistics Service of Ukraine. http://ukrstat.gov.ua/ Area, gross harvest and yield of agricultural crops in 2018, broken down by type and region

[8] State Statistics Service of Ukraine. http://ukrstat.gov.ua/ Areas under agricultural crops in 2019, broken down by type

[9] State Statistics Service of Ukraine. http://ukrstat.gov.ua/ Areas under agricultural crops in 2019, broken down by type

[10] http://www.ukrstat.gov.ua/operativ/operativ2017/sg/pvzu/arch_pvxu.htm

KEY PARTICIPANTS OF UKRAINE'S GRAIN MARKET

The key grain market participants include grain producers, processors, exporters, intermediate sellers, infrastructure resource providers, carriers, warehouse owners, and financial service providers.

Agricultural producers liaise with other market participants by supplying grain throughout the marketing year. An agricultural producer's behavior model varies depending on the company size, specialization, pattern of ownership or other features. Agricultural holding companies are Ukraine's largest growers of agricultural produce[12]. Agricultural producers have been traditionally selling grain to processors and intermediate sellers. At present, the key role is played by grain exporters who generate demand in the domestic market.

TABLE 3. TOP TEN AGRICULTURAL PRODUCERS

Position	Company	Land bank, '000 hectares
1.	Kernel	530
2.	UkrLandFarming	500
3.	Agroprosperis (NCH)	396
4.	Mironivsky Hliboprodukt	370
5.	Astarta-Kyiv	250
6.	Continental Farmers Group	195
7.	Epicentre K	160
8.	Harvest	124
9.	IMC (Industrial Milk Company)	124
10.	UkrPromInvest-Agro	120

Source: Data based on public information[11]

Processors are the main consumers of grain on the domestic market and are represented by flour and feed mills. These businesses usually have their own storage facilities. Processors usually buy grain from agricultural producers or intermediate sellers at the current (spot) prices throughout the marketing year.

TABLE 4. TOP TEN FLOUR MILLS

Position	Company	Market share
1.	Vinnytsia Bakery Plant	8,2
2.	Novopokrovka Bakery Plant	6,4
3.	Dnipromlyn	6,0
4.	Stolychnyi Mlyn	5,3
5.	Roma Commercial and Production Firm	4,2
6.	Ukrainian Flour Milling Company (Talne Bakery Plant)	4,0
7.	Chmielnicki Mlyn	3,3
8.	Kulindorovo Bakery Plant	3,2
9.	Krolovets Bakery Plant	2,6
10.	Vinnytsia Mlyn	1,9

Source: Data based on public information[13]

TABLE 5. TOP TEN FEED MILLS

Position	Company	Market share
1.	Mironivsky Hliboprodukt	25,3
2.	UkrLandFarming	6,5
3.	Ukrainske Zerno (Yedinstvo GC)	6,4
4.	Ovostar Union	4,8
5.	Agromars Complex	3,4
6.	APK-Invest	2,9
7.	Agro-Oven	2,2
8.	Poultry Complex "Dniprovskiy" LLC	2,2
9.	Volodymyr-Volynskyi Poultry Farm	2,0
10.	Niva Pereyaslavshchiny GC	1,7

Source: Data based on public information[14]

Exporters in the Ukrainian market are represented by subsidiaries of international companies and by Ukraine-based companies, such as Kernel and Nibulon, as well as by the State Food and Grain Corporation of Ukraine (SFGCU), a state-owned company.

TABLE 6. TOP TEN GRAIN EXPORTERS (IN THE FIRST 9 MONTHS OF 2018)

Position	Company	million tons	Position	Company	million tons
1.	Kernel	4,48	6.	ADM Ukraine	2,57
2.	Nibulon	3,72	7.	Cargill	1,84
3.	COFCO	3,03	8.	Glencore	1,75
4.	Bunge	2,84	9.	Agroprosperis (NCH)	1,54
5.	Louis Dreyfus Company Ukraine	2,73	10.	SFGCU	1,42

Source: Data based on public information[15]

Exporters buy grain both under forward and spot contracts. Not all traders are willing to work on forward conditions, although in certain companies the share of forward contracts is almost 15% of total purchases. Large agricultural holding companies are among leading exporters of grain from Ukraine.

Intermediate sellers, i.e., non-exporting domestic traders, form and deliver grain consignments on the terms and conditions agreed with buyers. The role of intermediate sellers in Ukraine has changed over time. At the

[11] https://latifundist.com/rating/top100#274
[12] Agricultural holding company is a vertically integrated structure that has a parent company and several regional subsidiaries. The parent company is generally in charge of foreign economic relations, such as the purchase of seed grain, plant protection products, fertilisers, agricultural machinery. Subsidiaries are directly engaged in production.
[13] https://latifundist.com/rating/top-10-proizvoditelej-muki-2017
[14] https://latifundist.com/rating/top-10-proizvoditelej-kombikormov-v-ukraine-2017
[15] https://latifundist.com/rating/top-10-eksporterov-zernovyh-ukrainy-2018

stage of market emergence, intermediate sellers played a key role in the agricultural market. Later, with the advent of large agricultural holding companies, the influence of intermediate sellers decreased significantly. Exporters prefer dealing with major agricultural producers directly, thereby increasing profits both for exporters and producers. Today, intermediaries also include export traders, as well as storage companies (silos, granaries).

TABLE 7. METHODS OF PURCHASING GRAIN FROM PRODUCERS

Type of purchase	Methods	Terms	Currency	Payment
Spot	Via local offices	EXW, CPT	USD-linked UAH	Cash against documents
Forward	Forward purchases	EXW, CPT	USD-linked UAH	Fixed prepayment / final payment under current market prices

Infrastructure resource providers. Recent years saw a growing role of suppliers of seeds, plant protection products (PPPs), and equipment. In the past, these companies only supplied agricultural producers with the necessary means of production. By now, the practice of commodity loans has become widespread: early in the production process, the infrastructure resource providers supply agricultural producers with seeds or plant protection products, while the loan is repaid with grain after harvest.

Financial sector. Current expenses are covered by agricultural producers mostly with their own funds. They turn to the banking sector primarily to fund their capital expenditures. In recent years, banks have become more interested in collaborating with the agricultural sector. Banks offer specialized financing programs for agricultural producers, such as “Hire-purchase of agricultural machinery (new and used)”, “Loans to finance working capital (for the fall and spring field work)”, surety on a bill (for the delivered fuel and lubricants, plant protection products, fertilizers, seeds), special partnership programs with the infrastructure resource providers, etc. Lending terms for agricultural producers usually include convenient repayment schedules with respect to seasonality of the business. The interest rate on such loans, nevertheless, remains quite high, and producers, particularly small and medium-sized ones, are looking for necessary cash resources outside the financial sector. For example, as of 30/01/2020, Raiffeisen Bank Aval lends at a nominal rate of 17%[16], Credit Agricole — at 18%[17], while PrivatBank — at 19% (excluding any other fees)[18].

Agricultural insurance in Ukraine is characterized by low demand — as of 2018, only 15% of agricultural enterprises insured their crops and harvest (according to a survey by UCAB Metrics)[19].

PHYSICAL INFRASTRUCTURE OF UKRAINIAN GRAIN MARKET

SILOS

A key condition for launching commodity derivatives is to ensure long-term storage of grains for subsequent transportation and delivery to fulfill futures contracts. Therefore, granaries (silos) must be equipped with product weighing and quality assessment equipment. According to the data accumulated by Pro-Consulting, as of 2019, Ukraine had grain storage facilities in place for 58.6% of the harvested grain crop[20]. These included 800 silos, having a 33.8 million ton capacity, meeting present-day requirements[21]. Silos provide grain crop acceptance, drying, storage, and shipping services[22].

Granaries (silos) must comply with the latest requirements on long-term storage of grains and subsequent deliveries under futures contracts.

[16] https://www.aval.ua/biznesu/kredity/kredituvannya-agrariyiv
[17] https://credit-agricole.ua/agro-biznesu/finansuvannya-290/investicijne-kredituvannya-1073-1481899804/kredit-na-rozvitok-biznesu-1750
[18] https://privatbank.ua/business/kreditnaja-linija-agrosezon
[19] http://ucab.ua/files/Doslidzhennya/Metrics_Demo_full.pdf
[20] https://pro-consulting.ua/ua/pressroom/v-zakromah-uzhe-stalo-tesno-analiz-rynka-elevatorov-v-ukraine-v-2016-5-mes-2019-gg
[21] From among 1200 silos, granaries, bakery plants and cereal receiving stations that operated in Ukraine in 2019, according to Pro-Consulting.
[22] Availability of handling facilities and drying are key to reducing the risk of damage to the grain and preventing a drop in its cost.

The demand for granaries is higher than the supply, especially for small and medium-sized farmers (as opposed to agricultural holding companies that are interested in expanding grain terminals and linear granaries). According to market participants, most of the silos are privately owned by traders or agricultural holding companies; therefore, without their involvement, the process of grain deliveries under derivative contracts might become complicated. Investments by medium-sized agrarians into the construction of new silos can offer a basis for the physical infrastructure in the delivery program under commodity futures (derivative) contracts.

Warehouse receipts certify the acceptance of grain of the relevant class and quality at the warehouse and are an important component in the goods delivery program under derivative contracts.

To certify ownership of the specified volume of grain of standard quality and class, licensed silos may issue a simple or double warehouse receipt[23]. Simple and double warehouse receipts may be used to facilitate deliveries under futures contracts, as the transfer of such a receipt is equivalent to the transfer of grain[24]. Besides, double warehouse receipts can be used as collateral to raise funds. Introducing electronic grain shipping certificates should also be considered in the future[25].

For the derivatives market to be developed, risks of fraud (such as theft of grain or substituting with lower-class grain) must be curtailed. This can be achieved by proper supervision of silos, as well as by promoting the practice of insurance against a failure by silos to discharge their obligations to owners of grain.

TRANSPORT LOGISTICS

Transport logistics is another key component in grain delivery. Ukraine's principal grain carrier (about 70%) is Ukrzaliznytsia, and the extensive railway network in place allows the grain market participants to be connected to seaports, so that their products could be exported. Ukraine's railway infrastructure is, however, underinvested, while shortage of locomotives in the peak periods of grain transportation, along with throughput capacity of port railway stations, limit the amount of transported grain. As a result, unlike higher grain harvest, the logistics throughput capacity remains the same. The main bottlenecks are both in the agricultural and railway infrastructure domains. They include[26]: i) the seasonality of grain transportation, the need to ensure availability of grain cars and locomotives in the peak months; ii) insufficiently developed grain storage infrastructure, limited handling capacity of silos; iii) a significant number of inefficient railway stations (with a daily load at 1–2 cars); iv) cargo collection routes where individual cars are coupled; v) Ukrzaliznytsia's deteriorating economic performance, including rail car turnaround times (long waiting times until cars are loaded with grain; subsequent concentration of cars pending unloading in seaports and terminals), etc.

Limitations of the transport infrastructure may result in failure to transport grain on time, leading to abrupt price fluctuations for futures contracts.

According to the analytical study carried out by the Centre for Economic Strategy[27], the declared liberalization of the railway transport market and reorganization of Ukrzaliznytsya are expected to accelerate the development of transport infrastructure to support shipments of major groups of export commodities.

Still, the following fact remains important for our research: as a result of existing limitations, long waiting times for loading and long storage in rail cars, grain gets downgraded and its price drops accordingly[28]. The problem

[23] Warehouse receipt is a document of title issued to bearer and certifying the title of this security holder to the goods stored at a certified warehouse https://zakon.rada.gov.ua/laws/show/2286-15

[24] Article 42 of the Law of Ukraine No. 37-IV "On Grain and Grain Market in Ukraine" dated 4 July 2002.

[25] In the U.S., for example, in addition to warehouse receipts that must be issued in a paper form under American law, an electronic document — the so-called "shipping certificate" — is used. Shipping certificate is a document used by a futures exchange to certify that the delivery operator selected by the exchange undertakes to deliver the asset to the buyer of the futures. The main difference is that a warehouse receipt certifies the storage of the grain of appropriate quality, while a shipping certificate evidences the obligation to deliver the asset (which may not be yet available) in the future.[25]

[26] https://www.ukrinform.ua/rubric-economy/2589897-obtazenna-vrozaem-cogo-brakue-pereviznikam-vagoniv-ci-produmanoi-logistiki.html

[27] https://ces.org.ua/transporteuintegration/

[28] https://www.growhow.in.ua/ahrovyrobnyky-vs-ukrzaliznytsia-khto-koho/

of decreasing prices of grain caused by storage degradation and downgrading is significant in the context of launching commodity derivatives for agricultural producers in Ukraine[29].

GOVERNMENT'S INFLUENCE ON THE BEHAVIOR OF GRAIN MARKET PARTICIPANTS

GOVERNMENT SUPPORT

In recent years, government support for Ukraine's agricultural market has changed significantly. Government support for agriculture was characterized by small amounts of direct government support and preferential VAT treatment — quite a significant preference in terms of volume. However, a decision was made to abolish this rule as of January 2017.

TABLE 8. ALLOCATION OF EXPENDITURES IN THE 2018 AND 2019 STATE BUDGET OF UKRAINE (UAH '000)

Line	2018	2019
Financial support for activities through cheaper loans	66,000	451,760
Research, applied scientific and technical development, work under special-purpose government programs and government orders in the field of the agro-industrial complex development	132,645	143,009
Financial support for activities in the agro-industrial complex	5,000	5,000
The Agrarian Fund's expenditures are associated with a range of measures to store, transport, process and export the items of government price control of the Government Intervention Fund	52,200	53,000
Financial support for agricultural producers	695,000	681,790
Financial support for farms	150,000	465,000

Source: The 2018 and 2019 State Budgets[30]

Financial support to business entities through cheaper loan program and reimbursement of lease payments[31] is intended to compensate a portion of the fees (interest) on bank loans.

Financial support to business entities through a program of purchasing Ukrainian-made agricultural machinery at lower prices. The Government reimburses 25%[32] of the price of the machinery purchased by farmers. The register of agrarians — recipients of reimbursement for the price of the machinery in 2018 — numbered 7,617 agricultural production entities, with about UAH351 million allocated.

Subsidy from the State Budget to assist agricultural producers and stimulate agricultural production[33] works as follows: a farmer who produces agricultural products using his own or leased fixed assets, where the percentage of agricultural products sold is at least 75% of the goods sold in the previous 12 months, is entitled, upon being entered in the Register of recipients of subsidies from the State Budget, to a subsidy from the State Budget to develop and stimulate agricultural production.

Compensation of construction costs of grain storage and processing enterprises[34] involves reimbursement[35] of 30% of the cost of the facility, including the price of equipment.

On the part of the financial sector, participants to the government reimbursement programs for agrarians include banks that have signed a relevant memorandum with the ministry in charge of agricultural policy in Ukraine. As of 21/08/2019, there are 29 such banks, of which 23 are allowed to participate in the government support programs[36].

[29] Problems with the timeframe for delivery of grain and its quality may cause peak (unexpected) fluctuations in the price of futures contracts. For example, as a result of failure to deliver (late delivery of) grain to a silo for subsequent shipment, the silo will be forced to buy back the futures contract (the so-called "one's own short position"), thereby causing a rise in the price of futures. The opposite effect is observed when suppliers are unable to deliver grain to silos.

[30] https://zakon.rada.gov.ua/laws/show/2246-19 – за 2018; https://zakon.rada.gov.ua/laws/show/2246-19 – за 2018

[31] https://minagro.gov.ua/ua/pidtrimka/zvitnist

[32] https://www.kmu.gov.ua/news/uryad-shvaliv-programi-pidtrimki-agrariyiv-na-2018-rik

[33] https://zakon.rada.gov.ua/laws/show/83-2017-%D0%BF

[34] https://agro.me.gov.ua/ua/news/dotaciyi-2019-uryad-kompensuvatime-vartist-budivnictva-pidpriyemstv-iz-zberigannya-ta-pererobki-zerna-instrukciya-z-otrimannya-koshtiv

[35] A blanket requirement is that in the legal entities whose core business is the supply of agricultural goods/services produced by them using their own or leased fixed assets, the percentage of such goods/services should be at least 75% of the value of all goods delivered by them in the previous 12 months. The same applies to newly founded agricultural producers conducting business less than 12 calendar months.

[36] https://agro.me.gov.ua/ua/pidtrimka/vzayemodiya-z-bankami

GOVERNMENT REGULATION OF THE GRAIN MARKET

Over the past two decades, various government policies have been pursued in Ukraine's grain market. Export policy, as a whole, may be split into four periods.

During the first period in 2001–2002, grain was exported without any restrictions. As a result, 3 million tons of wheat had to be imported in the 2003/04 marketing year. After this free market period, a complete export ban was imposed in 2006. This led to demurrage of dozens of ships in Ukrainian ports and significant losses for producers and exporters. Upon Ukraine's accession to the WTO in 2008, approaches to market intervention in general and regulation rules in particular were revised. Export quotas as a regulatory mechanism were first applied in 2010. Beginning in the 2011/12 season, changes were made to the government regulation of exports, and the practice of signing memoranda that contain the agreed grain export volumes for the season has been introduced.

The key government players on the domestic market are the Agrarian Fund, and the State Food and Grain Corporation of Ukraine (SFGCU).

The Agrarian Fund is in charge of grain procurement and sales of flour to satisfy domestic demand. Most of the grain is purchased under forward contracts[37]. Each year, the Fund buys up to 1 million tons of grain. It purchases wheat, corn, barley, rye, buckwheat, oats and peas.

The SFGCU is a domestic participant of Ukraine's grain market, engaged in grain storage, processing, transshipment and export. Over the last few years, the SFGCU was among the major exporters of grain and flour from Ukraine. The Corporation practices various forms of cooperation with agricultural producers, including regular purchases, forward contracts, supply of physical resources and provision of logistics and harvesting services.

THE AGRARIAN EXCHANGE OF UKRAINE

The Agrarian Exchange of Ukraine was established in 2005 by the Government and remains state owned. It provides exchange services of executing exchange-based agreements (contracts) for agricultural products; sales of commodity derivatives with agricultural produce as underlying assets; as well as to perform and/or manage clearing transactions[38]. The Exchange has its representatives in every region of Ukraine and operates with government funding. Farmers may be granted partial funding for the work or the necessary materials (such as fuel or seeds) in the current year under forward contracts executed with the Agrarian Exchange.

After the goods have been delivered, the final price is pegged based on current market prices. If the market price is lower than the contract price on the delivery date, the farmer must increase the amount of delivered grain. If the market price is higher than the contract price on the delivery date, the difference is paid to the agricultural producer. Farmers who sign contracts at the Exchange may also deliver more grain than specified in the original contract. Agricultural producers are also required to have crop insurance, payable to the Exchange, against its loss.

THE MODE OF THE AGRICULTURAL MARKET OPERATION

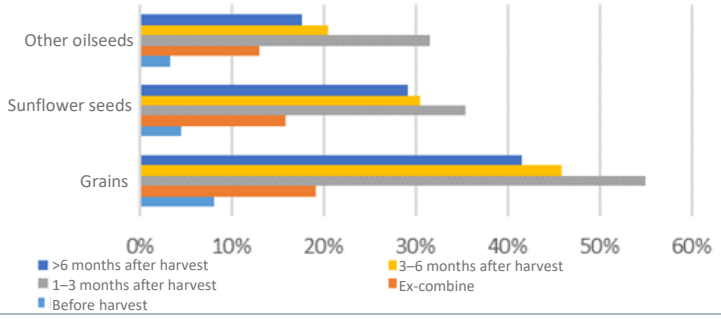
Survey findings indicate that grain production in Ukraine is funded with profit from the agricultural enterprises' core business. This source of financing was named by 96% of the surveyed agricultural producers. Other sources of financing (bank or other loans, financial aid, etc.) are used to a much lesser extent.

Traders and processors cooperate with all groups of producers. The traders and processors' procurement channels correlate with the overall market structure, where the number of small and medium-sized producers greatly exceeds that of other participants.

Ukrainian agricultural producers sell grains and oilseeds throughout the marketing year. The survey findings show that the main selling period is the time between 1 and 3 months or later after harvest. 20–30% of grains and oilseeds are sold before or during harvest.

[37] A forward contract is executed by the agricultural enterprise and Agrarian Fund PJSC. The down payment is 65% of the total price of the contract. Final settlement is at market prices at the time of grain delivery.
[38] https://zakon.rada.gov.ua/laws/show/1285-2005-%D0%BF

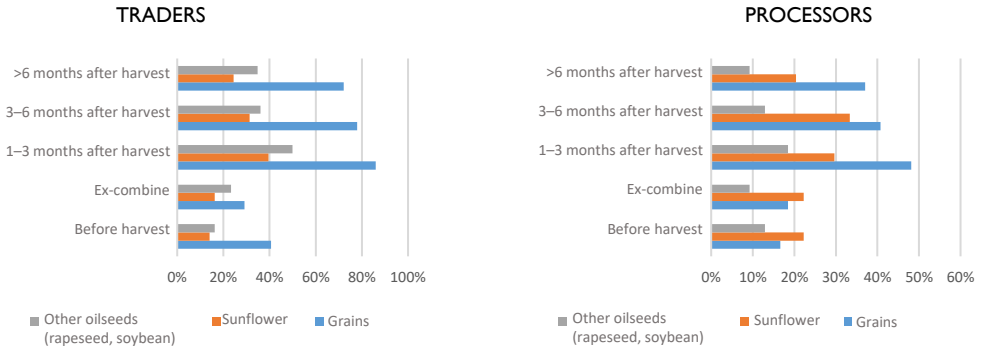
CHART 4. TIME OF CROP SALE IN UKRAINE



Source: Survey findings

Periods when most of the produce is purchased by traders and processors correlate with the time of sale by agricultural producers.

CHART 5. TIME OF CROP PURCHASE IN UKRAINE

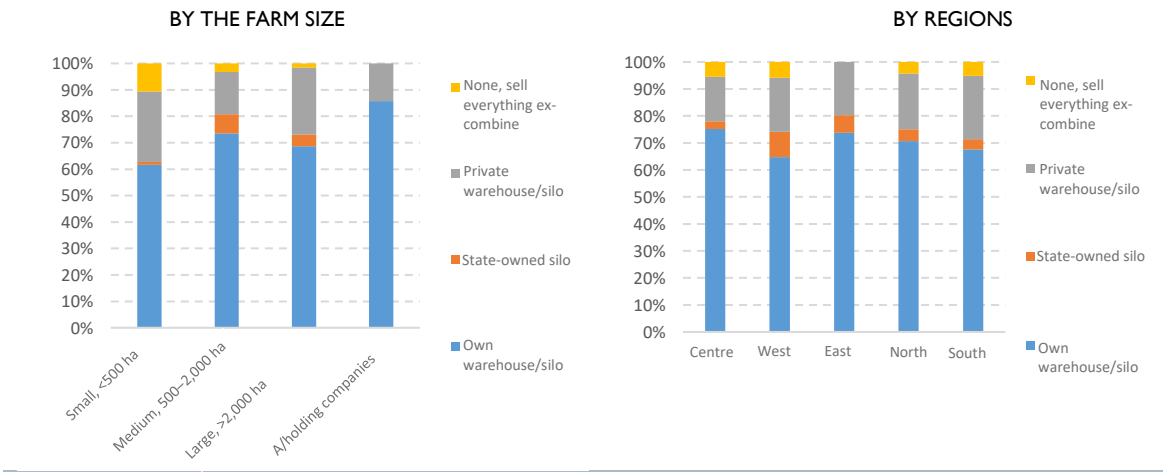


Source: Survey findings

The most common place to store crops immediately after harvest is the farm's own granary. 70% of respondents use their own private warehouse/silo, 21% — other private warehouses/silos, 5% — a state-owned warehouse, while 4% of the respondents never store crops (sell them ex-combine).

Among the reasons for selling most of the grain ex-combine by small-sized farms, compared to other producers, is the insufficient number of granaries.

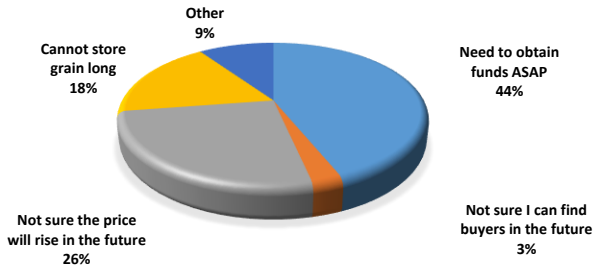
CHART 6. HARVESTED CROP STORAGE



Source: Survey findings

Reasons for quick sale (before or immediately after harvest) by the farmers: the need for quick financing (payment) and uncertainty regarding future price increases.

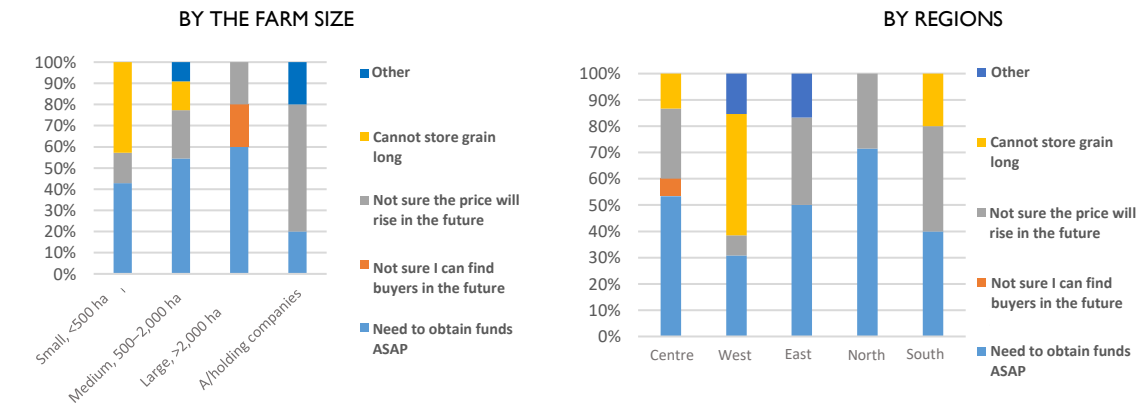
CHART 7. REASONS FOR SALE BEFORE OR IMMEDIATELY AFTER HARVEST (1)



Source: Survey findings

The identified reasons for the early sale of grain differ significantly, depending on the size of farms. For example, lack of long-term storage facilities is critical for smaller businesses. At the same time, the issue of price is essential for agricultural holding companies. The reasons behind regional differences include the lack of grain storage capacities in Western regions, and the need to settle with providers for the infrastructure resources supplied.

CHART 8. REASONS FOR SALE BEFORE OR IMMEDIATELY AFTER HARVEST (2)

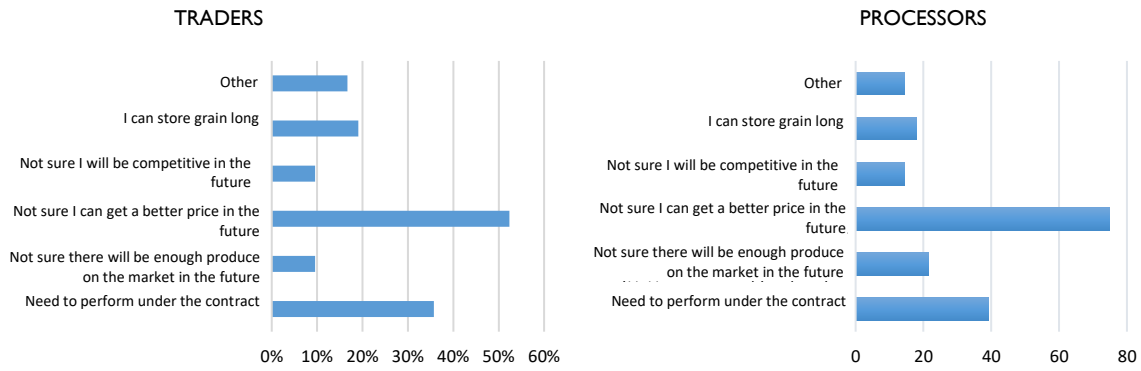


Source: Survey findings

Traders buy produce as early as possible because of: i) price risks; ii) the need to fulfill contracts.

Price risks and the need to fulfill contracts are the key reasons behind early purchases of grain by processors. For this group, sufficient availability of raw materials in the future is also critical.

CHART 9. REASONS FOR EARLY PURCHASES



Source: Survey findings

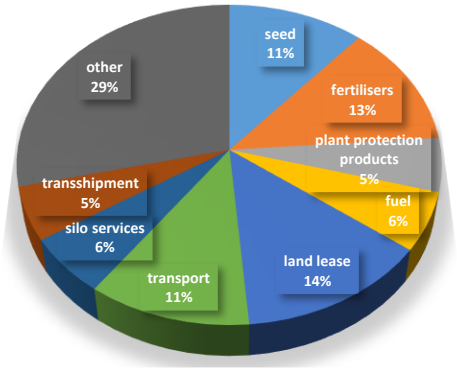
GRAIN PRICING IN UKRAINE

EXPORT PRICING

Export prices for grain in Ukraine, especially FOB prices, greatly depend on the global price dynamics and, to a smaller extent, — on internal factors. Ukrainian grain export prices are formed on the U.S. market (the Chicago Mercantile Exchange — CME). The U.S. is widely regarded as the largest global producer and exporter of this commodity.

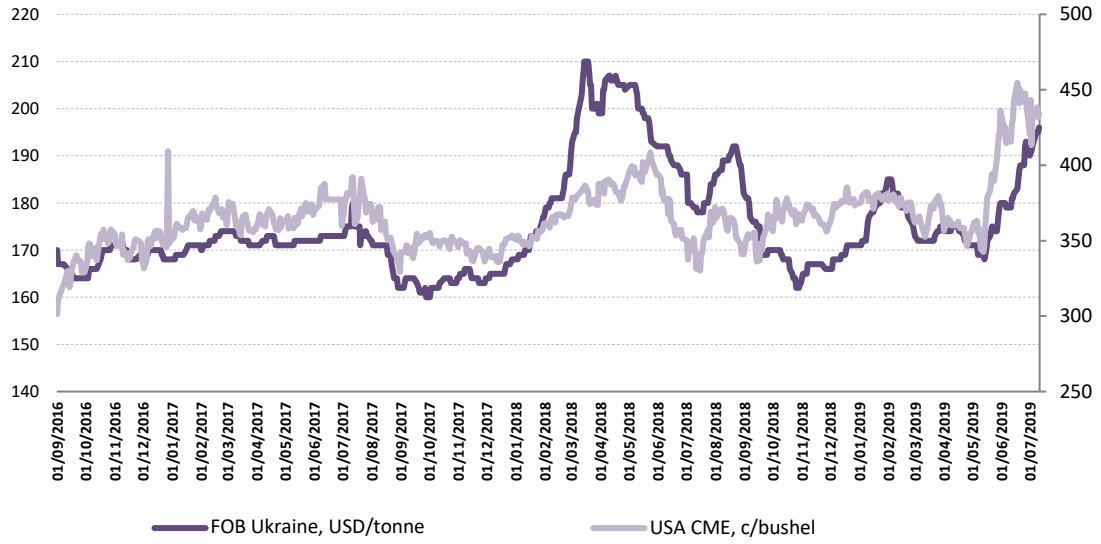
Correlation between corn export prices in Ukraine and CME corn prices for the MY 2016/17–2018/19 period is quite substantial.

CHART 11. CORN EXPORT PRICE COMPONENTS, 2019/2020 MARKETING YEAR



Source: UkrAgroConsult's calculations based on interviews with the market participants and market data analysis

CHART 10. CORN PRICE DYNAMICS, FOB UKRAINE VS CME, USA



Source: UkrAgroConsult

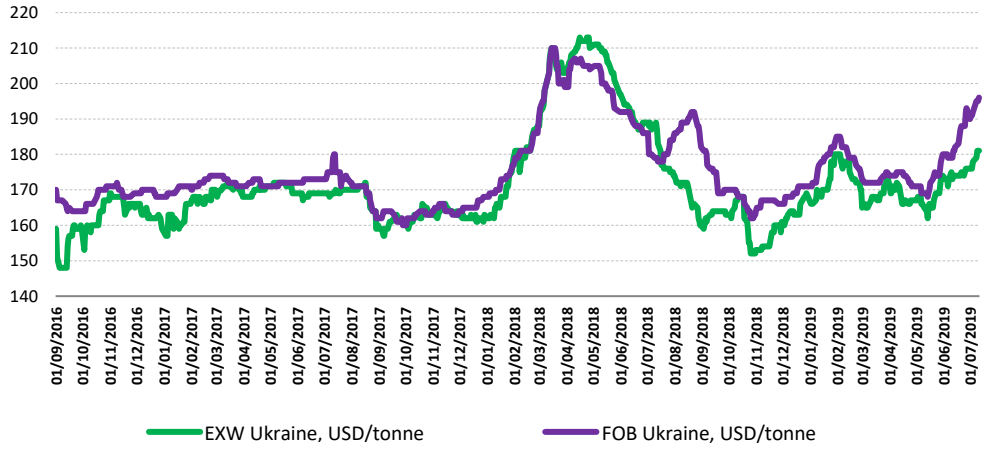
According to UkrAgroConsult, the key components of an export price, for example, that of corn, are the following: land lease, fertilizers, seeds, transport services, fuel, silo services, transshipment and others (chart 11).

DOMESTIC PRICING

As about 70% of the grain crop is exported, there is a direct correlation between export and domestic prices. The spread between FOB and EXW prices varies between 0 and 30%. Sometimes, for a brief period, domestic prices may even exceed export prices. This situation, for example, may be observed at the end of the season, when domestic prices are affected by low stocks and reduced supply, while exporters are already focused on a new grain harvest.

Besides, zero VAT is charged on grain exports in Ukraine, i.e., exporters are entitled to VAT refund. In those instances where the domestic market experiences a shortage of grain supplies, exporters have to pay prices higher than export prices in anticipation of subsequent VAT refund from the government.

CHART 12. CORN PRICE DYNAMICS, EXW UKRAINE VS FOB UKRAINE



Source: UkrAgroConsult

The correlation between FOB and EXW prices is further affected by numerous factors, such as domestic demand, supply of grain, foreign exchange rates, as well as by the associated grain production costs, the regulatory framework, government intervention, etc.

Expenditures on logistics services are a significant factor that determines grain prices. For the period from 2009 through 2015, costs of grain transportation quadrupled in the national currency. In 2016–2019, prices of grain transshipment services in ports decreased, while the internal transportation component of the cost increased.

Furthermore, a study by the Food and Agriculture Organization of the United Nations[39] summarizes the basic principles of domestic grain price formation as follows: grain prices on the domestic market drop just after harvest and rise toward the end of the marketing season; domestic grain prices are closely correlated with international grain prices (key variables in establishing the price for Ukrainian grains include fluctuating freight rates, costs of port handling, etc.); low import duties on grain maintained by Ukraine (in the event of crop failure, grain prices on the domestic market may reach those of imported grain).

[39] http://www.fao.org/3/i3337e/i3337e.pdf

SECTION 2. RISKS FACING UKRAINE'S AGRICULTURAL SECTOR AND THE PRACTICE OF MANAGING THEM

Note: All our calculations contained in this section are approximate and used for illustrative purposes only.

The main risks for the Ukrainian agricultural sector are yield risk and price (market) risk. The survey shows that price risk is the source of highest concern and greatest anxiety for 56% of grain producers, 57% of processors and 37% of traders, while yield risk, caused by unstable weather and climate, comes next in importance, as stressed by 65% of producers, 50% of traders and 57% of processors.

Key components of agricultural risk management for Ukrainian farmers include risk identification, assessment, and management strategies. Management strategies for major risks may include the following tools: risk mitigation, risk transfer, and risk coping.

RISKS FACING UKRAINE'S AGRICULTURAL SECTOR

The findings of the survey, and world agricultural experience generally, suggests the following risks to agricultural producers.

1. **Yield risk.** Occurs because of changes in weather and climatic conditions, may manifest itself as droughts, late rains, excessive temperatures and, as a result, in a decreased yield, impaired phytosanitary status of crops, low quality and reduced volume of harvest.
2. **Market (price) risk.** Market risks for farmers are caused by fluctuations both in input prices (of logistical resources, such as diesel fuel, mineral fertilizers) and selling prices for grain on the domestic and global markets, resulting in potential financial losses for grain market participants[42]. The price risk is also exacerbated by the exchange rate volatility, cost of borrowings, as well as by the counterparty risk.
3. **External risks.** Agricultural business is greatly affected by sudden changes in the state or sectoral regulation[43], by military conflicts, trade restrictions[44], logistical bottlenecks, theft, which cause financial losses for agricultural market participants.

TABLE 9. MAP OF THE KEY RISKS FACING UKRAINE'S AGRICULTURAL SECTOR

YIELD (PRODUCTION-RELATED) RISKS	MARKET (PRICE) RISKS	EXTERNAL RISKS
• Drought, late rains; • Irregular irrigation; • Excessive temperatures; • Phytosanitary status of crops and harvest;	• Volatility of domestic grain prices; • Volatility of global grain prices; • Exchange rate volatility; • Volatility of prices for logistical resources; • Risks related to settlements with counterparties; • Fund raising;	• Political risks, military conflicts; • Collapse of infrastructure/logistical constraints; • Damage to/shortage of goods;

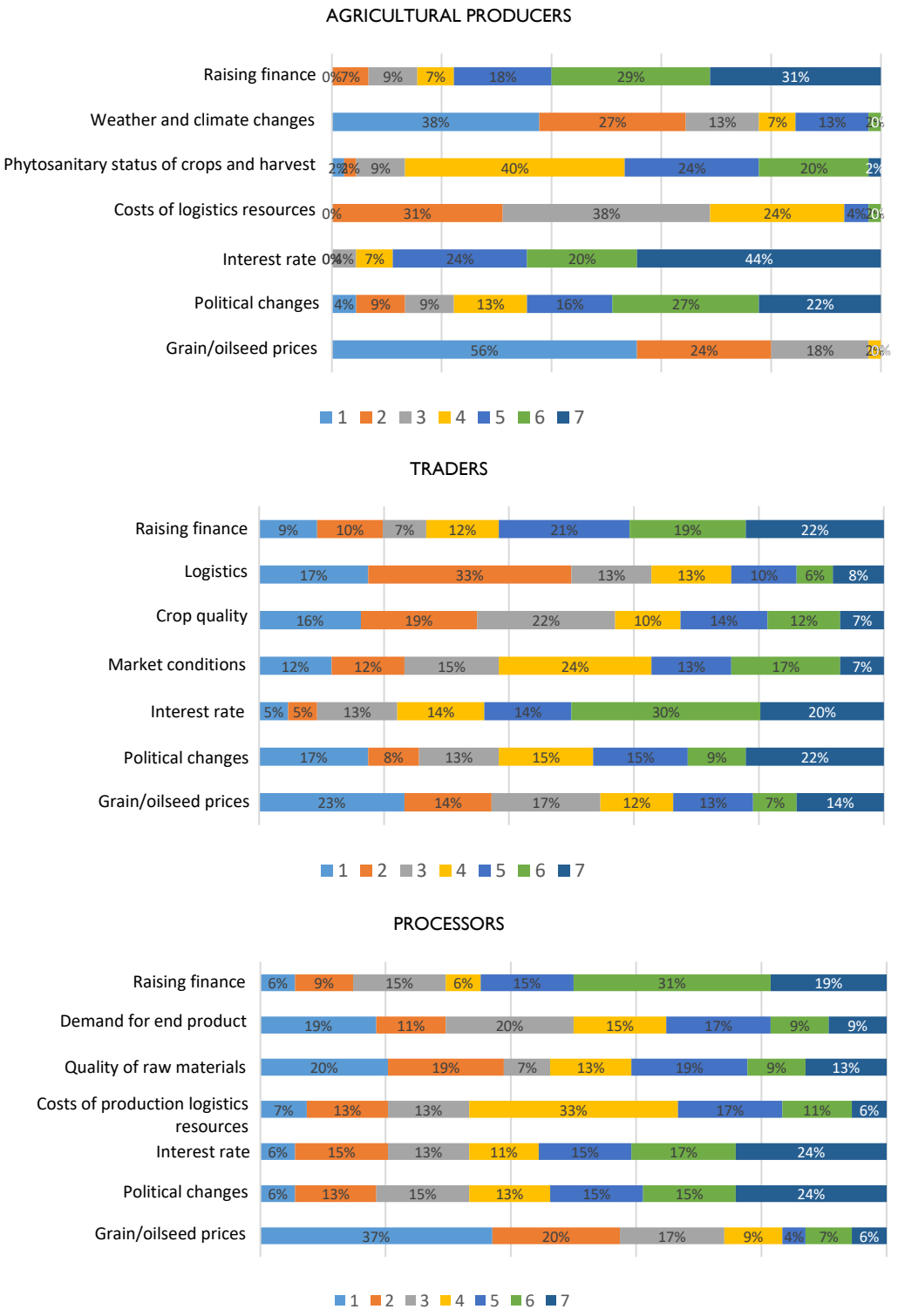
Source: Our own interpretation, based on the analysis performed by UkrAgroConsult, the USDA Economic Research Service[40], World Bank[41]

RISK AWARENESS OF UKRAINIAN FARMERS

Survey findings show that the Ukrainian grain market participants are aware that price risks play the key role in their operation and affect managerial decision-making. Among the respondents, price risk is the cause of the greatest concern for 56% of the producers, 23% of the traders, and 37% of the processors. Unlike weather risks, price risks can be managed, and modern tools that minimize them are available.

[40] https://www.ers.usda.gov/webdocs/publications/40946/51060_aer774b.pdf?v=0
[41] The World Bank (2016), Agricultural Sector Risk Assessment: Methodological Guidance for Practitioners
[42] An imbalance between purchase prices on the domestic market and selling prices on the export market may occur when grain is sold for export. There is also a risk of a significant drop in export prices for the Ukrainian grain sold abroad, while the purchase price on the domestic market remains high, resulting in increased risks for the exporter. Hedging price risks in this context is necessary.
[43] Political risk is associated with possible changes in the course of the government's activities and changes in its priorities. Russia's military aggression against Ukraine has significantly increased the instability of the political situation across the entire Black Sea Region. The result was the loss of some of agricultural production following the annexation of Crimea and partial occupation of the Donetsk and Luhansk Oblasts, as well as infrastructure losses (capacity of Crimean ports). By occupying Crimea, Russia unilaterally controls the Kerch Strait and the Sea of Azov basins. The matters of sea border delimitation and shipping safety control thus cannot be regulated by Ukraine in these areas.
[44] The Government may impose restrictions to keep domestic prices low in years of low yield. In these circumstances, exports are significantly reduced. In the last decade, no export restrictions were imposed by the Government, with export ceilings determined through memoranda signed by the Government and market participants.

CHART 13. AGRICULTURAL MARKET PARTICIPANTS' CONCERN WITH RISKS

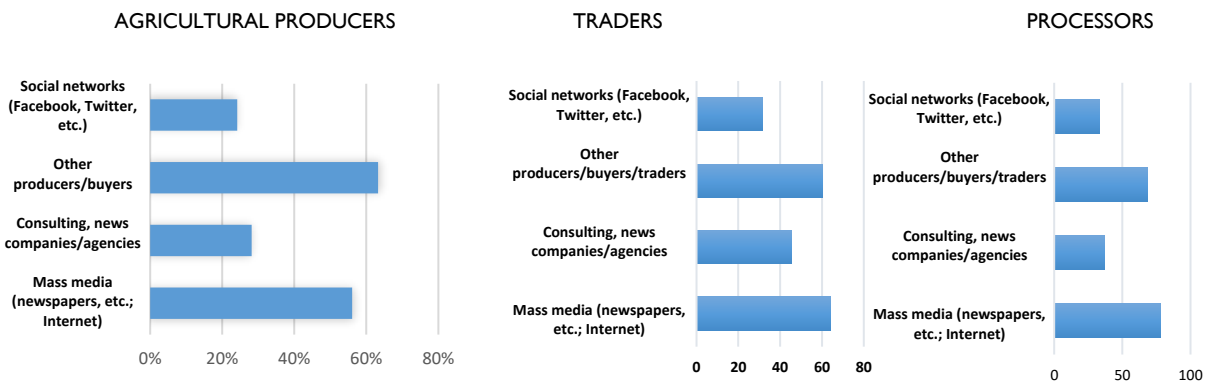


I — very concerned, 7 — not concerned

Source: Survey findings

A separate set of questions in the survey concerned the sources of grain price information used by market participants. Consolidated responses indicate that the principal sources of information for all market participants include other participants and the media. Consultancy agencies and social networks are used to a lesser extent.

CHART 14. SOURCES OF PRICE INFORMATION FOR THE AGRICULTURAL MARKET PARTICIPANTS



Source: Survey findings

Market participants monitor price trends with varying frequency. Traders and processors monitor prices, both on the domestic market and international exchanges, several times a day. Agricultural producers pay almost no attention to prices in the international markets. This is especially true for small and medium-sized agricultural producers.

VOLATILITY OF GRAIN PRICES AND YIELD — A NEW REALITY

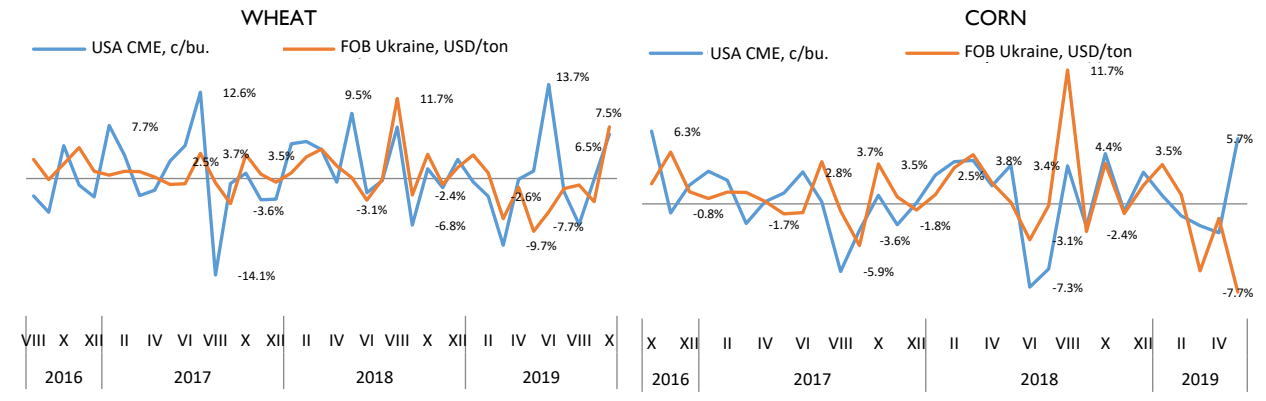
Thus, as our research indicates, price risk and yield risk are key for Ukrainian agrarians. To build their own risk management strategies, agrarians should have an idea of the amount of potential losses or lost income and their likelihood.

PRICE RISK

Grain price expectations are based on such factors as the projected future crop yield and expected supply and demand levels.

We have reviewed historical volatility, based on the CME wheat and corn prices in the United States and FOB prices in Ukraine (according to UkrAgroConsult), for the period between July 2016 and October 2019.

CHART 15. HISTORICAL VOLATILITY OF WHEAT AND CORN PRICES[45], USA CME VS UKRAINE FOB (MONTH-TO-MONTH AVERAGE PRICE INDEX)



Source: Calculations based on the price data from UkrAgroConsult

Using wheat as an example, we attempted to estimate fluctuations in the average monthly price changes at CME, which peaked from -4.9% to +4.8% compared to the previous month in 2016, from -14.1% to +12.6% in 2017, from -6.8% to +9.5% in 2018, and from -9.7% to +13,7% in 2019. FOB prices in Ukraine fluctuated between -0.2% and +4.5% in 2016, -0.6% and +3.7% in 2017, -3.1% and +11.7% in 2018, -7.7% and +7.5% in 2019 (see Chart 15).

[45] To calculate historical volatility, we have developed a month-to-month average price variation index.

As a rule, volatility increases during the sowing season and is quite high during the growing season. Information about weather or projected crop yield affects forward prices for wheat and corn. Volatility begins to decrease in September, when the expected crop yield becomes more obvious[46].

We assessed grain price fluctuations in Ukraine using standard deviation[47] of daily prices for each year[48].

TABLE 9. STANDARD DEVIATION OF WHEAT PRICES, FOB UKRAINE, JUNE 2016 TO OCT. 2019

Year	USD/ton
VI-XII 2016	$6.86
June–Dec. 2016	$6.86
2017	$6.04
2018	$13.50

TABLE 10. STANDARD DEVIATION OF CORN PRICES, FOB UKRAINE, JUNE 2016 TO OCT. 2019

Year	USD/ton
IX-XII 2016	$2.39
Sep.–Dec. 2016	$2.39
2017	$4.41
2018	$13.52

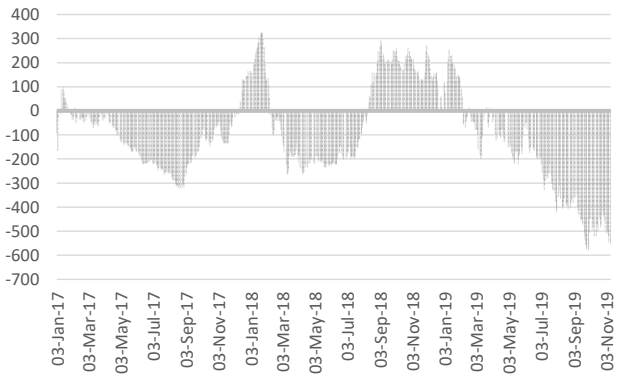
It should be noted that awareness of price volatility is also important for further development of the stock market infrastructure, as the central counterparty[49] needs this awareness to decide on the required margin payment[50] based on the standard price deviation, i.e., potential deviation from the average market price[51] (for more details about the necessary changes to the stock market infrastructure please see Section 4). This information is also necessary for the producer to have an idea of the amount of cash to be deposited for transactions at the exchange.

CURRENCY RISK

In addition to the volatility of global grain prices, Ukrainian agricultural producers also face currency risk. Taking the hryvnia to the U.S. dollar rate for 01/01/2017 as a benchmark, we calculated exchange differences on 1 ton of wheat according to the data on the FOB grain prices in Ukraine.

During the period between January 2017 and November 2019, the floating hryvnia rate decreased and increased revenues in the hryvnia equivalent from -581 UAH/t to +325 UAH/t for the market participants in 2017–2019. Thus, the unpredictable exchange rates and the insufficient number of currency risk hedging instruments may cause potential losses for farmers and complicate business planning.

CHART 16. EXCHANGE DIFFERENCE FROM FLUCTUATIONS IN THE USD/UAH CURRENCY PAIR ON THE PRICE OF 1 TONNE OF WHEAT, FOB UKRAINE



Note: exchange difference between the fixed and floating hryvnia exchange rates. The rate at 24.83 UAH/USD as of 01/01/2016 is taken as benchmark

Source: Calculations based on the price data from UkrAgroConsult, the National Bank of Ukraine

YIELD RISK

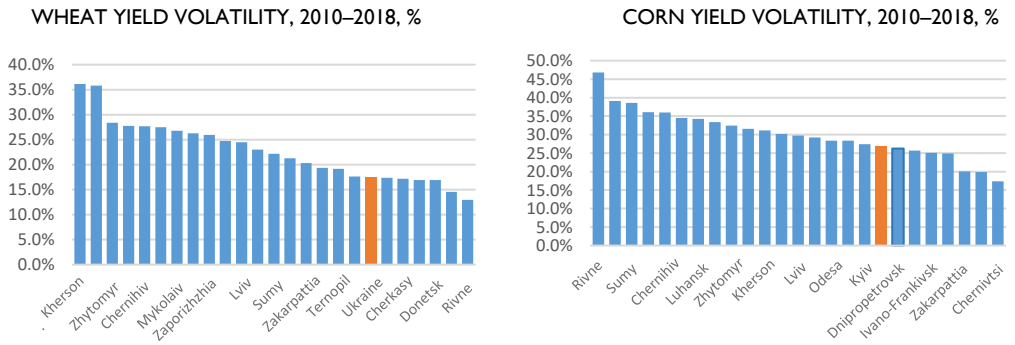
Yield risk is closely associated with price risk. Yield and price move in opposite directions. According to the USDA[52] survey, "domestic and international prices for agricultural produce go up when the crop yield is low and vice versa, as the overall demand for food grows with each year, while supply may fluctuate considerably due to weather changes in major produce supplying countries."

[46] https://www.ers.usda.gov/webdocs/publications/40946/51060_aer774b.pdf?v=0
[47] Standard deviation is a measure of dispersion (spread) of values of a random variable about its expectation, i.e., its centre of distribution (arithmetic mean).
[48] To ensure maximum confidence in the representativeness of the data, we have built a confidence interval around the standard deviation for the entire study period. Thus, it is possible to have a clear idea of the difference between the current market price and its historical arithmetic mean. For grain, the results are as follows: the average CME USA price is 470.7 USD/bu., standard deviation interval (99% confidence) is USD45.2±4.06, or 9.6±0.9%; the average FOB Ukraine price is 189.5 USD/t, confidence interval (99%) is USD19.73±1.77, or 10.4±0.9%. The situation with corn is as follows: the average CME USA price is 365 USD/bu., standard deviation interval is USD21.3±2.11, or 5.848±0.58%; the average FOB Ukraine price is 175.14 USD/t, standard deviation interval is USD10.8±1.07, or 6.169±0.612%.
[49] Central counterparty is a legal entity that performs clearing activities and assumes mutual rights and responsibilities of the parties to transactions with respect to securities the obligations under which are admitted to clearing, and becomes a buyer for each seller and a seller for each buyer.
[50] Margin payment means cash or assets that are collected by the central counterparty to cover the potential (or actual) price change under the agreement.
[51] By using the estimation method for the full price history, the central counterparty may have at its disposal the most reliable market volatility indicator.
[52] https://www.ers.usda.gov/webdocs/publications/40946/51060_aer774b.pdf?v=0

Unlike price risk, yield risk correlates geographically. Crop yields vary throughout Ukraine and depend on the type of soil, climate, acreage, etc. Yield volatility can be measured at the regional and national levels. If the national level only were to be used, the level of yield risk for agricultural producers in specific areas of Ukraine might be underestimated.

Yield risk varies between regions and is higher in many regions compared to the national level.

CHART 17. STANDARD DEVIATION OF GROSS WHEAT AND CORN YIELDS IN UKRAINE (2010–2018)



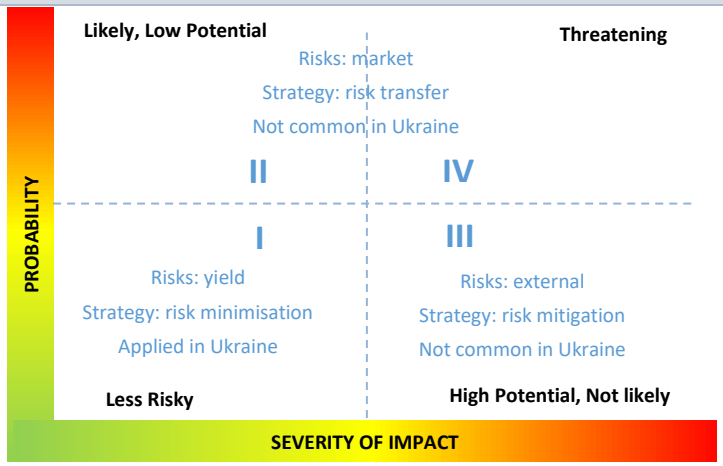
Source: Calculations based on the data from the State Statistics Service of Ukraine

HOW UKRAINIAN FARMERS CAN MANAGE RISKS

According to the above calculations, Ukrainian farmers face significant variability in crop yields, especially in the regions, as well as price fluctuations. In our rough estimates, standard deviation of wheat prices between June 2016 and October 2019 was between 6.86 and 19.8 USD/t, that of corn prices — from 2.39 to 13.52 USD/t; exchange rate losses in certain periods could be as high as about 550 UAH/t. As a result, the agricultural sector loses revenues, while transparent pricing for future grain harvests becomes more complicated. At the same time, unlike most other countries (positive and negative international experience will be discussed in Section 3), application of financial hedging instruments, similar to derivative contracts, is not widespread in Ukraine.

"Natural hedge" (negative correlation between yield and grain prices) does not protect agricultural producers against potential losses and other risks and fluctuations of, for example, demand for Black Sea wheat/corn across global markets. Therefore, Ukrainian farmers should consider managing their risks proactively in the course of their business.[55]

CHART 18. RISK HEAT MAP AND RISK MANAGEMENT STRATEGIES AVAILABLE IN UKRAINE



Source: Our own interpretation, based on the data from UkrAgroConsult, World Bank, USDA[53][54]

[53] The World Bank (2016), Agricultural Sector Risk Assessment: Methodological Guidance for Practitioners
[54] https://www.ers.usda.gov/webdocs/publications/40946/51060_aer774b.pdf?v=0
[55] Passive risk management implies "natural hedge" or "going to cash" immediately after harvest

OPTIONAL RISK MANAGEMENT SOLUTIONS IN AGRICULTURE

The World Bank groups agricultural risk management activities under three categories: i) risk minimization strategies[56]; (ii) risk transfer strategies[57]; and iii) risk mitigation strategies[58].

TABLE 11. POTENTIAL RISK MANAGEMENT CAPABILITIES IN UKRAINE'S AGRICULTURAL SECTOR

Risk	Management strategy	Risk management solutions
Yield risks: • Drought, late rains; • Irregular irrigation; • Excessive temperatures; • Phytosanitary status of crops and harvest;	Risk minimization strategy Risk transfer strategy	• Agronomic practices • Diversified sowing • Risk insurance
Market (price) risks: • Volatility of domestic grain prices; • Volatility of global grain prices; • Exchange rate volatility; • Volatility of prices for logistical resources; • Risks related to settlements with counterparties; • Fund raising;	Risk transfer strategy	• Forward contracts • Futures contracts • Options • Insurance
External risks: • Political risks, military conflicts; • Collapse of infrastructure/logistical constraints; • Damage to/shortage of goods;	Risk mitigation strategy Risk transfer strategy	• Insurance • Agricultural funds, strategic reserves • Minimum price insurance programs • Programs to restore farmers' operation

Source: Our own visualization, based on the World Bank Data, analysis performed by UkrAgroConsult, the USDA Economic Research Service[59]

We have sorted probable risk management solutions for Ukrainian farmers across the so-called Risk Heat Map, depending on the probability of their occurrence and impact on the results.

We see from the Risk Heat Map that the Ukrainian grain market participants (except a few traders and agricultural holding companies) apply yield risk minimization tools; however, they remain exposed to market (price) risks and external risks.

The **risk minimization tools** used by the farmers include both purely agronomic practices that allow Ukraine to harvest record crops (such as drainage, fertilization and application of plant protection products), and diversified sowing of different crops.

The **second group of risk transfer tools**, such as insurance, reinsurance, and financial hedging instruments (forwards, futures and options), are not commonly used in Ukraine to hedge price fluctuation risk. At the same time, agricultural producers are exposed to fluctuating prices for their produce (the volatility and standard deviation of grain prices were discussed above), the cost of materials and other services (such as storage, transportation, certification, etc.) during the marketing year.

The third group of **risk mitigation tools** concerns the national level and implies the availability of loss compensation programs (agricultural funds, minimum price insurance programs, strategic grain reserves), as well as of programs to restore and expand farmers' operation (technical and financial support from the government to the agricultural market participants, debt restructuring, continuous funding).

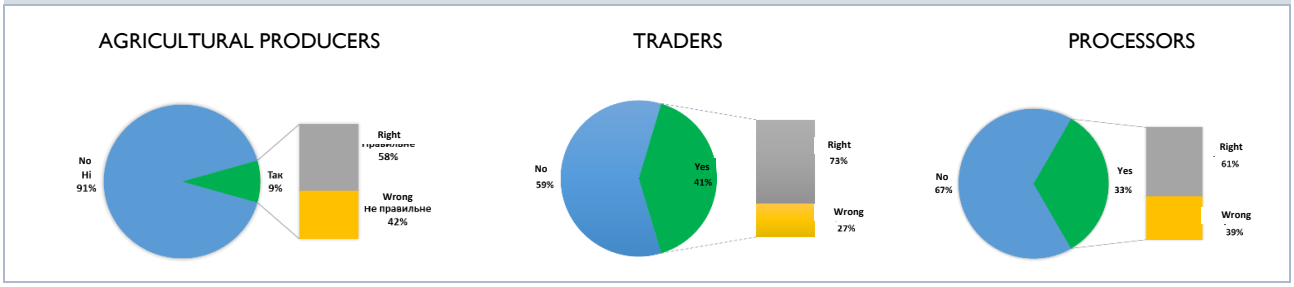
In this research, we did not intend to analyze in detail the tools for managing any potential risks, focusing instead on the key one — the price risk[60] — and commodity derivatives as a solution in managing this risk.

[56] Risk minimization strategy involves taking action to prevent risks by reducing their likelihood and frequency and severity of losses. Risk minimization strategy is used for events that happen frequently, but without critical impact on financial performance.
[57] Risk transfer strategy is applied when risk minimization tools are unavailable and provides a mechanism of transferring losses from realisation of risks to a third party, usually through payment of a commission fee or premium. These tools involve determination of the amount of compensation in the event of losses.
[58] Risk mitigation strategy is used when risks cannot be covered through minimization or transfer.
[59] https://www.ers.usda.gov/webdocs/publications/40946/51060_aer774b.pdf?v=0
[60] However, this study uses information about most other risks that, as previously established, are interconnected and ultimately affect grain prices.

ARE FARMERS WILLING TO USE DERIVATIVES?

During the survey, we focused on the issues associated with the awareness of, and opportunities for, using financial instruments, which would allow for price risks to be hedged.

CHART 19. UNDERSTANDING THE CONCEPT OF DERIVATIVE CONTRACTS



Source: Survey findings

The survey findings indicate the lack of modern risk management practices that involve the use of derivatives. The survey confirmed that the interaction between the Ukrainian agricultural market participants was mostly based on spot contracts. This leads to higher price risks.

Two main reasons have been identified for a dysfunctional derivatives market in Ukraine: (i) no exchange in Ukraine has sufficient liquidity and number of players; and (ii) low awareness coupled with fears of market participants regarding higher risks.

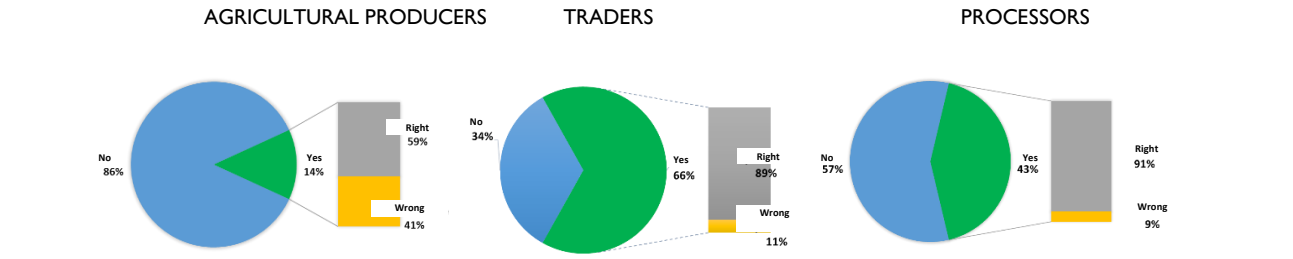
The majority of the respondents gave a negative answer to the question "Do you know what derivatives are?", while among those who responded positively, not everyone was able to provide the correct definition of derivatives[61].

TABLE 12. HAVE YOU EVER USED DERIVATIVES?

Market participant	Percentage of positive answers ("Yes")
Agricultural producers	12%
Traders	38%
Processors	20%

Most of the surveyed market participants answered "no" to the question "Have you ever used derivatives?" Among the respondents, traders have more experience, while processors and agricultural producers have less experience in using derivatives.

CHART 20. UNDERSTANDING THE CONCEPT OF RISK HEDGING



Source: Survey findings

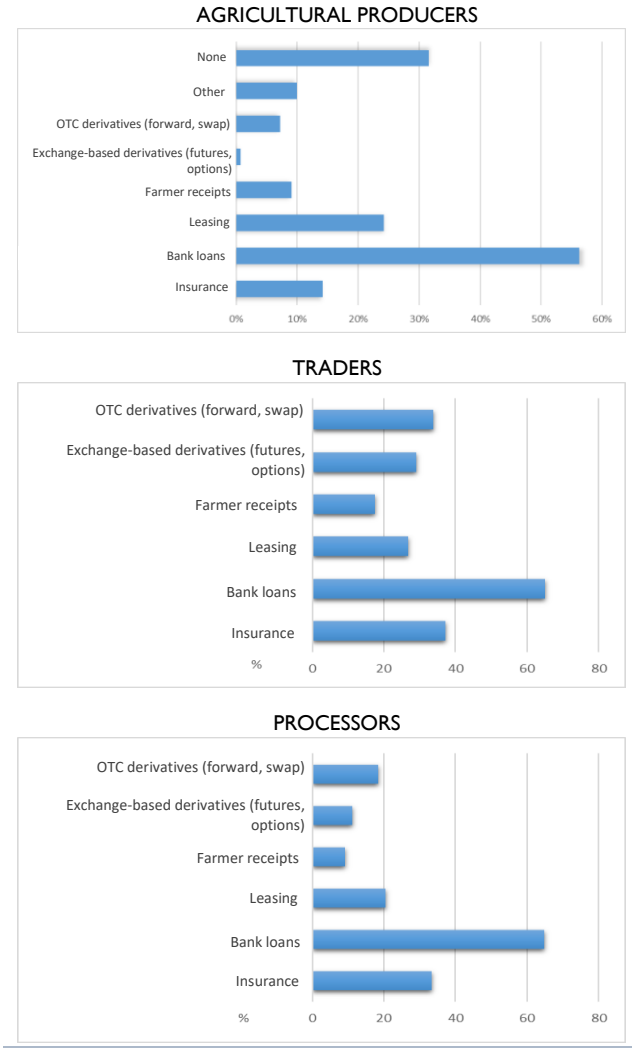
The survey findings indicate better awareness of the concept of hedging on the part of the market participants. Most of them gave the correct definition of hedging[62]. Hedging tools are most commonly used by traders and processors, which correlates with the survey data.

[61] The following definition is used: Derivative is a contract evidencing the right and/or obligation to purchase or sell the underlying asset (such as grain) on specific terms and conditions in the future.

[62] The following definition is used: Hedging is a form of insuring the value of goods or profits to reduce risks associated with possible changes in the market, demand or prices for the duration of the contract.

As the survey findings show, Ukraine's grain market participants have some experience of using forward contracts, which is a transitional step towards transactions in futures and options. However, small volumes of grain are sold under forward contracts, whereas futures contracts are used even less. For the market participants, financial services, such as bank loans, insurance, etc., are the key ones.

CHART 21. USE OF OTC FINANCING INSTRUMENTS



Source: Survey findings

Among Ukraine's market participant companies, traders have the most experience in hedging risks: a total of 66% of the respondent traders use derivatives (exchange-traded and over-the-counter), primarily through their international head offices, since price risks are addressed by head offices/parent companies only. Producers use derivatives the least — 9% of the respondents, while 29% of respondents among the processors have indicated using derivatives for hedging.

This was predominantly associated with hedging wheat and rapeseed contracts at the MATIF, or wheat, corn, and soybean contracts at CME. All the categories of the surveyed market participants stressed the importance of knowing market prices. Furthermore, the respondents have no idea of how derivatives should be accounted for in Ukraine, what the tax consequences might be, and emphasize that derivatives are hard to grasp for them.

The survey findings demonstrate that, among those interested in using derivatives, participants who are yet to decide about using derivatives have the vaguest understanding of the concept of derivatives (see Chart 23).

Market participants stress the need and willingness to obtain additional knowledge about the operation, advantages, etc., of the derivatives market.

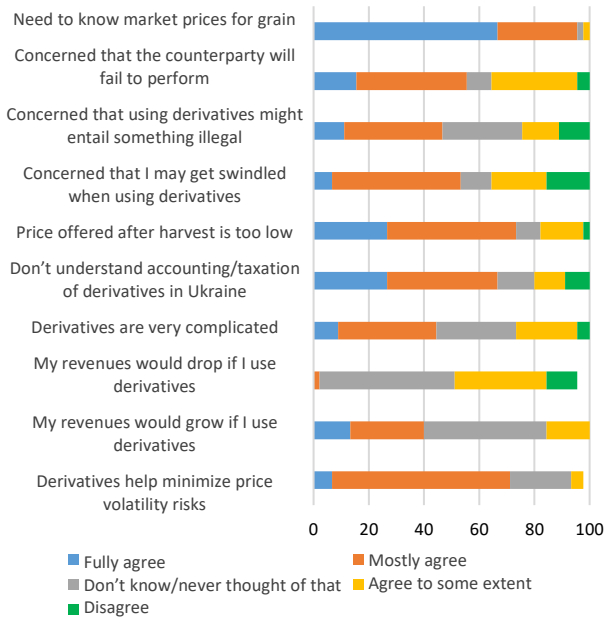
The majority of market participants say that they would hedge risks with derivatives if this market starts functioning in Ukraine. The greatest interest is shown by the traders, which correlates with their experience and awareness of these matters.

TABLE 13. INTEREST IN ACQUIRING ADDITIONAL KNOWLEDGE ABOUT MASTERING THE TOOLS THAT REDUCE PRICE RISKS

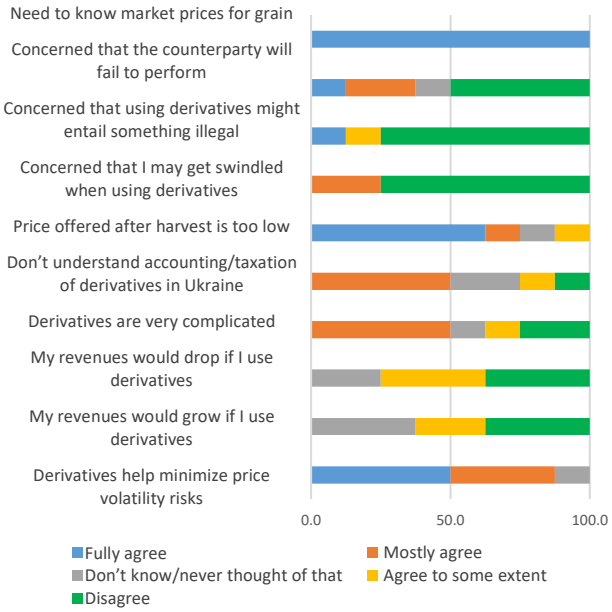
Market participant	Percentage of positive answers ("Yes")
Agricultural producers	74%
Traders	4%
Processors	80%

CHART 22. THE AGRICULTURAL MARKET PARTICIPANTS' ATTITUDE TO DERIVATIVES

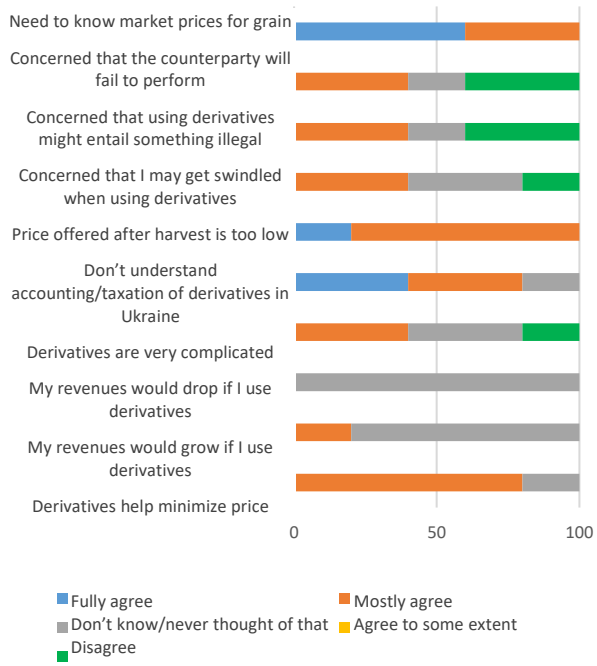
AGRICULTURAL PRODUCERS



TRADERS

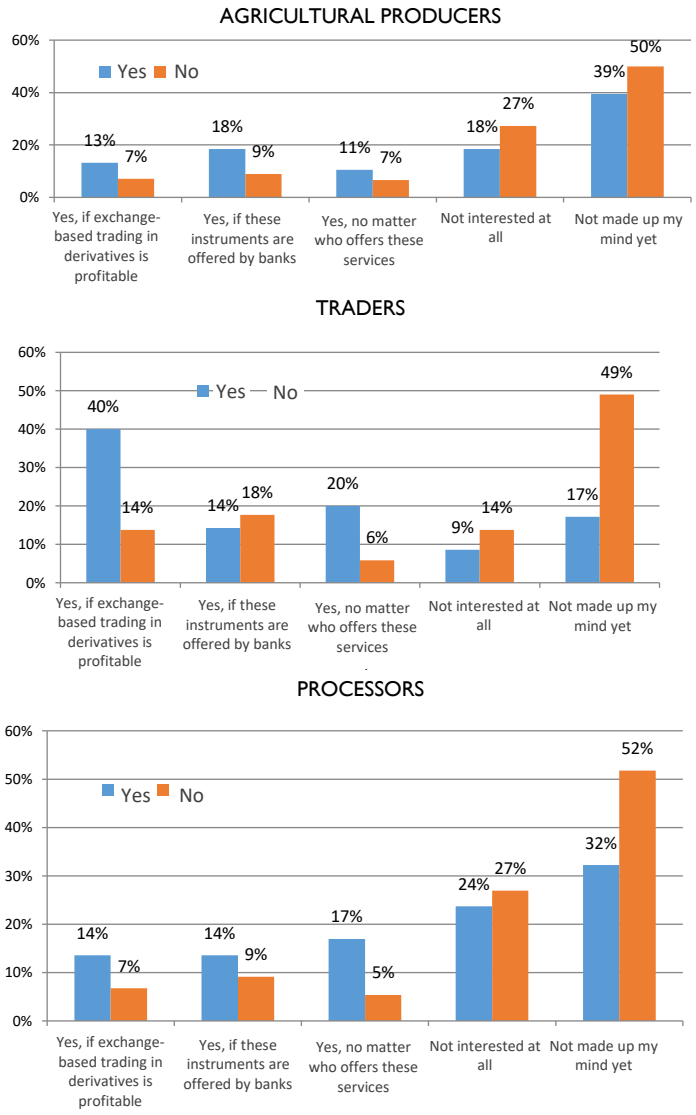


PROCESSORS



Source: Survey findings

CHART 23. INTEREST IN USING DERIVATIVES TO HEDGE RISKS



Source: Survey findings

Most market participants have a general knowledge of derivatives and price risk hedging, but do not put it into practice. As often as not, they fail to comprehend in full the importance and profitability of hedging their own risks. Only a portion of them — traders primarily — make an active use of these financial instruments.

All the categories of the surveyed market participants stressed the importance of market price knowledge. The respondents concurred that the price after harvest was very low. Awareness that price risks can be reduced encourages the market participants to study and apply these financial instruments.

The survey findings suggest that a significant group of market participants is yet to decide about using derivatives. Moreover, most market participants have no idea how derivatives should be accounted in Ukraine, and, for them, derivatives are too complicated. These groups of the market participants require special attention in terms of conveying to them the importance of using financial instruments that reduce price risks.

This situation indicates the need not only for extensive awareness-raising activities focused on the importance of financial instruments for the market participants to minimize price risks, but also for setting up the appropriate environment at the national level for their active implementation.

For the derivatives market in Ukraine to become fully operational, it is essential to: (i) improve the legal framework for the operation of the derivatives market, taking into account the definitions of the concept, accounting, taxation and liability for violations, which apply to all the market participants; and (ii) create a suitable environment for safe and efficient operation of a liquid exchange, thereby helping to attract the participants in sufficient numbers. This will be discussed in greater detail in Section 4.

FORWARD, FUTURES AND OPTION CONTRACTS — A PRACTICAL DIFFERENCE FOR FARMERS

As discussed above, application of a risk transfer strategy through financial hedging instruments, such as forwards, futures and options, is not widespread in Ukraine. In this study, our aim was not to provide a theoretical overview of derivatives, but rather focus on the key differences that the Ukrainian farmers and officials should be aware of.

Survey findings show that the attitude toward derivatives is different across various groups of market participants. Unlike traders, a high proportion of agricultural producers are afraid of doing something illegal when using derivatives or of being deceived, or do not understand how transactions with derivatives should be posted in tax and financial accounts.

In practice, more than 70% of grain and oilseeds are currently sold under spot contracts after harvest. Forward contracts are yet to become widely accepted.

TABLE 14. FEATURES OF GRAIN FORWARD, FUTURES CONTRACTS AND OPTIONS

	Forward contracts	Futures contracts	Options
Fixed price	Yes	Yes	Yes
Price risk	N/A	N/A	N/A
Traded on the exchange (standardization)	No[63]	Yes	Yes
Optional withdrawal from the contract (access to liquidity)	Limited	Yes	Yes
Basic risk	Present	Present	Present
Counterparty risk	Present	None (if CCP is present)[64]	None (if CCP is present)
Yield risk	Present	Present, with optional withdrawal from the contract	Present, with optional withdrawal from the contract

Source: Interpreted on the basis of worldwide theoretical definition for each contract.

FORWARD CONTRACTS DO NOT ELIMINATE ALL MARKET RISKS FOR FARMERS

The benefits of forward contracts on the Ukrainian agricultural market include fixed prices, amount and quality of the produce, which allows farmers to plan transactions and to rely on cash flows. Having full information, buyers, in turn, would provide themselves with sufficient raw materials for further processing and/or for discharging their obligations under forward export contracts. It should be noted, however, that doubts exist about pricing of bilateral forward contracts executed in Ukraine outside the exchange by two business entities on the unique terms and conditions for both parties. This generally complicates the process of monitoring the pricing and regulating a failure by either party to fulfil the respective obligations, and impedes early termination of the contract.

To sum up, forward contracts fix the date, amount and quality of grains to be delivered from the seller to the buyer. The downsides:

- Bilateral contracts concluded unbeknownst to the rest of the market;
- No centralized market reporting and data gathering, thus, no immediate market information;
- Due to a fixed price nature of a forward contract, a party might incur losses or unrealized profits if market conditions drastically change;
- Every forward contract includes unique and specific conditions which makes it difficult to trade;
- Strict and non-flexible termination provisions;
- The choice of counterparties is limited;
- No one to guarantee settlements and/or delivery.

FUTURES AND OPTIONS — TOOLS TO HEDGE THE REMAINING RISKS

As seen above, forward contracts are not the most efficient hedging tools. Instead, two other types of derivative contracts could be used — futures[65] and options[66]. They have the following benefits:

[63] There is a practice of trading forward contracts on the exchange. This study is based on global practices, where a forward contract is overwhelmingly an over-the-counter instrument.
[64] In the EU, all exchange transactions must go through a clearing house https://www.investopedia.com/terms/c/clearinghouse.asp. There are OTC and unique options, as well as futures contracts that do not undergo the clearing procedure.
[65] A futures contract is a standard instrument that documents the obligation to buy (sell) the underlying asset at a specified time and on specified terms and conditions in the future, with the price predetermined for the time of discharge of obligations by the parties to the contract.
[66] Option is a derivative financial instrument that documents the right to purchase (call option) or sell (put option) the underlying asset (securities, goods, currency) in the future on the terms and conditions defined at the time of executing the options contract.

first, these are exchange-traded contracts where an active trade with numerous bids from sellers and buyers takes place, which brings the price of the instrument to an effective market level and ensures sufficient access to liquidity.

second, given that this is a fixed-term exchange-traded contract, it is standardized, which in turn means that it may be assigned to another interested party, i.e., the contract may in fact be sold (potentially, at a lower/higher price than the original one).

third, this type of contract can mostly exist in the presence of a central counterparty that must re-evaluate the party's position on a daily basis and, in the event of sudden changes in the market conditions, should maintain incentives for both parties to the contract fulfill it, which significantly reduces the counterparty risk. Moreover, the central counterparty, by doing mark-to-market and collecting variation margin, reduces the risk of a party's default.

The main difference between a futures and an option is that a futures contract is an obligation to fulfill the contract on the expiration date, while an option entitles its holder to settle the contract on the expiration date[67] (or, depending on the option type[68], at any time), which is why options are regarded as a more flexible instrument.

Based on this information, the following conclusion could be made: forward contracts do not mitigate all risks for farmers and do not offer a proper mechanism for hedging risks in Ukraine's agricultural market. However, exchange derivatives like options and futures are a lot more beneficial, flexible with regard to withdrawal/termination and allow farmers to properly hedge their risks. Thus, Ukrainian market participants will benefit more from grain derivatives market and post-trade infrastructure services rather than working exclusively with forward agreements.

Today, options and futures contracts are not in demand at Ukrainian stock exchanges. This is explained, first, by the legal uncertainty of such types of contracts — namely, in terms of settlement (by physical delivery or in cash), risk management, and the role of regulators[69]. Second, according to the survey findings, not all the agricultural market participants are aware of and realize potential benefits of fixed-term contracts.

In order to resolve this problem, appropriate laws should be passed and dialogues be conducted with market participants, explaining to them all the advantages of fixed-term contracts.

THE IMPACT FROM LAUNCHING AGRICULTURAL DERIVATIVES IN UKRAINE

During the research, we have established that the launch of a commodity exchange and derivative contracts in Ukraine would allow the Ukrainian market participants not only to: (i) manage market (price) risk; but also to: (ii) reduce asymmetry of price information between different groups of market participants.

These arguments are vital in an ongoing key debate between the market participants on whether their own commodity exchange should be launched or leading international exchange platforms should be used.

Managing price risk and reducing asymmetry of price information are vital arguments in an ongoing key debate on whether to launch derivatives at a Ukrainian commodity exchange or use international exchange platforms

EFFECT FROM PRICE RISK MANAGEMENT

The agricultural market participants must be aware of the price of executing derivative contracts in Ukraine compared to any potential losses that may be incurred if the risk materializes.

Risks may be assessed by calculating the price volatility (in Section 2, we attempted to assess the volatility of prices, for example, for wheat in Ukraine, which, according to our approximate calculations, ranged between 13.5 USD/t in 2018 to 19.8 USD/t in 2019).

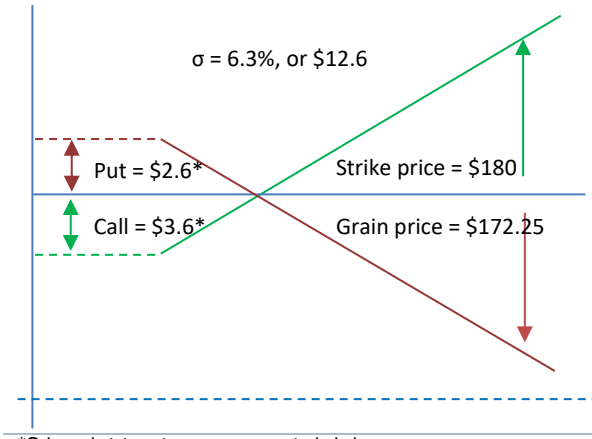
Instead, the cost of hedging for buyers of derivatives requires further investigation. The price will depend on liquidity of the exchange, the instrument, the cost of services provided by investment broker companies,

[67] Expiration means the expiration date for the option or futures, as specified in the contract.
[68] A European option is a contract that confers the right, rather than obligation, to exercise the contract on its expiration date. An American option confers the right, rather than obligation, to exercise the contract at any time before its expiration date.
[69] Bill 2284, "On Amending Certain Laws of Ukraine Regarding the Simplification of Raising Investments and Introduction of New Financial Instruments", is intended to introduce comprehensive regulation of derivative contracts and organised markets.

administrative cost of the central depository services and of clearing through the central counterparty (monthly fees and commission fees on each transaction).

To illustrate this point, we present the notional price of options on Ukrainian grain (see Chart 24), calculated using one of the methodologies[70]. The result of the calculation stipulates that the price of a one-year call option on grain is 3.6 USD/mt, while that of a one-year put option on grain — 2.6 USD/mt. At the same time, the grain price volatility is 6.3% or USD 12.6, meaning that prices can go up or down by 12.6$. Therefore, the cost of hedging with a call or put option (3.6$ and 2.6$) is lower than the actual price risk (12.6$)[71]. Even though this section illustrates a synthetically derived option contract, the logic upholds – hedging risks is, in most of the cases, a cheaper solution than facing and bearing the entire risk exposure.

CHART 24. COST OF HEDGING AND COVERING PRICE RISK, USING OPTIONS AS AN ILLUSTRATION



*Other administrative expenses not included.
Source: Interpretation on the basis of calculations and historical price data from UkrAgroConsult

If the matter of the price of derivatives is to be studied further, one should bear in mind that the cost of hedging will also include administrative expenses, commission fees, infrastructure costs of the central counterparty's services, and the need for the party to the contract to make the margin payment (deposit) for the risk management procedure[72].

The introduction of the central counterparty services will prevent the impact of default under derivatives contracts on the market participants and will ensure settlements. This, in turn, will increase the agricultural market participants' confidence in the safety and transparency of the executed derivative contracts.

Thus, upon the launch of agricultural derivatives, market participants will be in a position to estimate the costs of executing derivative contracts, take advantage of the market management, and decide on the feasibility of incurring additional hedging costs.

REDUCING THE ASYMMETRY OF PRICE INFORMATION

In Section 1, we considered the grain pricing mechanism in Ukraine. Despite a wide range of final destinations for grain deliveries (India, Egypt, China, Spain, the Netherlands), sales to these end customers are managed through a highly dense network of intermediaries linked to grain traders and based in jurisdictions with a low tax base, primarily in Switzerland, Cyprus, and the UK[73].

The final price for Ukrainian grain is thus formed abroad, according to the top-down principle, under forward contracts between Ukrainian grain traders and end customers. The purchase price is further adjusted for the trader's margin; FOB purchase prices at Ukrainian ports are formed for, and, minus transport logistics and grain storage services, the EXW price is formed, which agricultural producers, small farmers and traders accept as the internal price for grain. Producers convert it into the national currency and make payments.

[70] Prices were calculated on the basis of the Black-Scholes method for valuing options, using the calculator available at https://www.erieri.com/blackscholes. The input data (volatility, asset price) was provided by UkrAgroConsult; the risk-free annual rate at 10% was taken for 2019. The contract duration is six months. Option strike price, which roughly corresponds to the logic of historical prices for an asset (crop).
[71] Exchange quotes are for one metric tonne; however, the total volume of a single contract is 50 metric tonnes, with at least 5 contracts per deed.
[72] In practice, this will mean that the central counterparty will invest the collected margin payments in short-term low-risk financial instruments and, from the interest/trading income received, will be able to pay interest on the balance of margin payments.
[73] Profit shifting in Ukraine's exports of agricultural commodities (prepared by the GUE (European United Left) / NGL (Nordic Green Left) in the European Parliament, https://www.guengl.eu/issues/publications/profit-shifting-in-ukraines-exports-of-agricultural-commodities/

TABLE 15. UKRAINE. CORN EXPORT PRICE FORMATION CHAIN, USD/T

	price	road haulage to granary	granary (silo) services			haulage to port (by rail)	trader's margin	loading on ship
			cleaning and drying	one-month storage	loading in a rail car			
	producer's price **$109**	+$5						
EXW	EXW price = $114		+$3	+$2				
FCA	FCA price = $119				+$6	+$28		
CPT port	CPT port price = $153						+$3	
CRT port +	CPT port price adjusted for trader's margin = $156							-$10
FOB	FOB price = $166							

Source: UkrAgroConsult's calculations based on interviews with the market participants and market data analysis

During the survey, more than 60% of the agricultural producers confirmed that they received price information from other producers or buyers of their produce. While the traders and processors monitor prices on the domestic and global markets on a daily basis, the producers, by contrast, have no information about grain quotes on international exchanges. This is particularly true for small and medium-sized businesses and farmers.

In this case, information asymmetry occurs, where access to information in some market participants and lack thereof in others allow for price terms to be dictated to the producers[74]. For the producers, the situation is also exacerbated by infrastructure and logistics constraints, i.e., the need to transport grain to silos and store it there.

One of the reasons for this situation is the reluctance on the part of the producers to take risks; they thus sell the crop ex-combine or within the first few months after the harvest. Among the reasons for "going to cash" quickly, the survey respondents listed the following: not being sure about higher prices in the future (26%), the desire to get funding quickly (44%), and no opportunities for long-term grain storage (18%). As a result, the traders quote to the producers the price adjusted for their desire of a quick sale.

Therefore, pricing at a local commodity exchange and under hryvnia derivatives will make Ukrainian farmers more aware of grain prices, thereby offering the producers an opportunity to bring the price of grain as close as possible to the market one and to have a Ukrainian indicator in place for comparing the Ukrainian traders' export prices with quotes on exchanges.

[74] This mostly concerns optional lowering of the purchase price, but also increasing it, if a trader is required to deliver additional volume of grain under the export contract

SECTION 3. INTERNATIONAL EXPERIENCE OF MANAGING AGRICULTURAL DERIVATIVES TRADING

The survey indicates that 66% of the respondent traders already hedge price risks at international exchanges (with exchange-traded and OTC derivatives). Rapeseed and wheat price risks may be hedged with futures and options at the MATIF; with corn, wheat, soybean futures/option contracts at CME.

TABLE 16. FEATURES OF FUTURES CONTRACTS AT THE MATIF, CME (PLATTS), AND CME (SRW)

	MATIF[75][76]	Black Sea Wheat Platts (CME)[77]	Chicago SRW (CME)[78]
Quoted prices	Euros and euro cents per ton	Us dollars and cents per metric ton	Us dollars and cents per bushel
Trading hours	10.45–18.30 (UTC-1)	Sun-Fri 17.00–16.00 (18.00–17.00 ET) with a daily 60-minute break at 16.00 (17.00 ET)	Sun-Fri 19.00–07.45 CT, and Mon–Fri 08.30–13.20 CT
Tick size	€0.25/t, i.e., €12.50 per 50 tons	USD0.25/t, i.e., USD12.50 per 50 tons	USD0.0025/bu., i.e., USD12.50 per 5,000 bushels.
Contracts traded at the exchange	September, December, March, June, such that 12 delivery months are available for trading	Monthly contracts listed for 15 consecutive months	March (H), May (K), July (N), September (U), and December (Z) listed for 15 consecutive months.
Settlement (delivery)	In an approved silo in Rouen (France) and Dunkirk (France)	Financial settlement	Financial settlement and at approved silos

Source: The Euronext and CME Group websites

Futures and options at these three exchanges are based on the classes and standards that are mostly similar to those of the Ukrainian wheat, corn, soybean and rapeseed. However, their functionality as a price risk hedging tool is constrained by the distance to the delivery location, trading hours for these contracts, and, sometimes, by a weak correlation between price fluctuations of the FOB Ukraine and futures contracts at the said exchanges.

To make price risk hedging more accessible to the producers and grain market participants in the Black Sea region, CME developed and launched trading in the Black Sea Wheat and Corn contracts in 2016. These two contracts are identical to other wheat and corn futures contracts traded on CME. Terms of the Black Sea contracts provide for the same settlement mechanism through the CME clearing system. The lower level of open interest and, accordingly, of the instrument liquidity on the Black Sea Wheat contracts compared to other similar contracts means that physical trade in Black Sea Wheat depends on the opening price[79] in the EU and the U.S.

Case 1. Black Sea Wheat futures contract.

The contract stipulates delivery on FOB terms by a market participant that has an open short position under at least 75 contracts (10,200 metric tons) to one of five Ukrainian ports, three ports in Russia, or one port in Romania. By denominating the contract price in U.S. dollars and by including Russian and Romanian ports, CME created a risk management tool designed for the growing Black Sea grain export market, and, thanks to its structure, this tool minimizes the risk of default or market interference by any of these three countries. Since the contract is listed at a foreign (U.S.) exchange, it is regulated by a legal framework that supports enforcement of the contract and resolution of disputes.

Unlike Ukraine, the derivatives markets for agricultural products are in place in many countries with a significant agricultural industry. The degree of their development and effectiveness varies. The success of a derivatives market depends on numerous factors.

[75] https://www.barchart.com/futures/quotes/ML*0/profile
[76] https://live.euronext.com/en/product/commodities-futures/EBM-DPAR/contract-specification
[77] cmegroup.com/trading/agricultural/grain-and-oilseed/black-sea-wheat-financially-settled-platts_contract_specifications.html
[78] https://www.cmegroup.com/trading/agricultural/grain-and-oilseed/wheat_contract_specifications.html
[79] Opening price means the first calculated current price during a trading day in an organized market, such as a futures exchange.

There are at least five reasons why market risk minimization instruments (primarily those based on the use of exchange-traded derivatives) have an advantage over government interference[80]:

1) unlike government programs aimed at price stabilization, market instruments provide greater certainty of future cash flows for market participants;
2) market instruments rely on market rather than on administratively regulated prices, shifting risks to financial markets that are able to manage risks better than the government. Market instruments thus cost less for the economy than government intervention;
3) the availability of a derivatives market can make financing conditions more favorable for the producers and consumers of agricultural produce through minimization of price risks and higher reliability of borrowers' obligations;
4) agricultural derivatives markets are the most efficient and transparent pricing mechanism for agricultural produce
5) an important benefit of an efficiently organized derivatives market is low transaction costs for its participants, liquidity, standardized requirements on the produce and delivery terms.

Agricultural derivatives trading volumes at the world's leading exchanges:

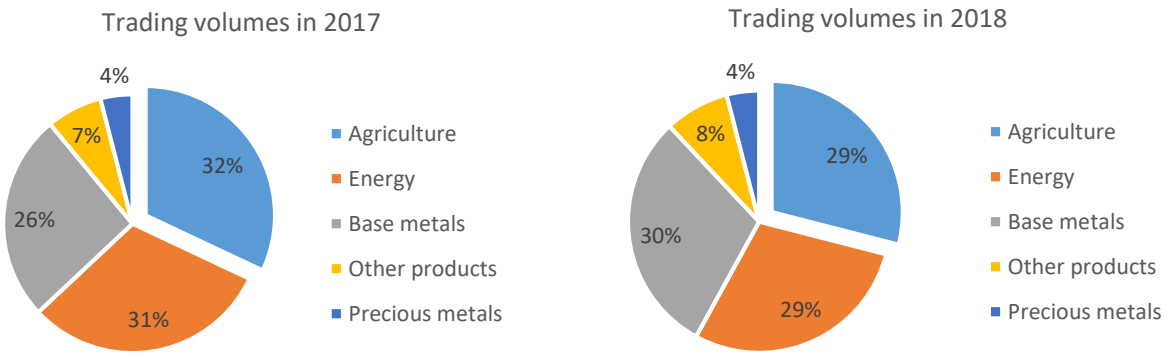
TABLE 17. AGRICULTURAL DERIVATIVES TRADING VOLUMES AT THE WORLD'S LEADING EXCHANGES[81]

	Volume		Underlying asset price		Open interest	
	2018	2017	2018	2017	2018	2017
America						
Brasil Bolsa Balcão S.A. (Brazil)	2,047,833	2,176,488	9,782	13,319	79,426	120,858
CME Group (USA)	372,920,627	339,625,678	11,078,826	10,040,654	7,211,056	7,169,327
ICE Futures Canada	0	5,545,879	0	43,537	0	162,847
ICE Futures USA	86,929,376	70,654,342	N/A	N/A	N/A	N/A
Asia-Pacific						
ASX	87,650	82,007	9,352	8,773	628	423
Bursa Malaysia	11,044,817	11,958,341	147,780	194,778	224,775	271,139
Dalian Commodity Exchange	505,127,262	533,107,585	2,442,413	2,679,951	3,024,669	3,214,605
Multi Commodity Exchange of India	1,947,383	2,437,131	15,429	18,412	24,252	25,747
NZX	336,732	311,675	70,233	1,036	7,394	52,163
Shanghai Futures Exchange	61,845,475	89,341,052	1,070,693	2,110,180	217,355	218,426
Singapore Exchange	1,813,192	1,475,595	N/A	N/A	86,397	84,356
Thailand Futures Exchange	34,482	10,613	N/A	N/A	60	521
Zhengzhou Commodity Exchange	368,664,004	195,632,377	3,309,894	1,482,109	1,296,446	177,915
EMEA						
Borsa Istanbul	835	19	1	N/A	N/A	N/A
Budapest Stock Exchange	2	542	N/A	11	N/A	4
Euronext	14,583,707	13,165,273	180,600	160,861	654,920	619,824
ICE Futures Europe	475,821,387	465,903,095	28,002,451	23,499,921	12,510,332	12,910,894
Johannesburg Stock Exchange	3,292,622	2,906,705	46,540	45,397	176,211	164,113
LSE Group	0	174	0	2	N/A	N/A
MOEX	1,075	283	0,28	0,10	84	14
Total	1,906,498,461	1,734,334,851				

Source: World Federation of Exchanges

[80] Myong Goo Kang and Nayana Mahajan. An introduction to market-based instruments for agricultural price risk management. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS Rome, 2006.
[81] WFE IOMA 2018 Derivatives report. https://www.world-exchanges.org/storage/app/media/statistics/WFE%202018%20IOMA%20Derivatives%20Report%20FINAL%2010.04.19.pdf

CHART 25. PERCENTAGE OF PRINCIPAL TYPES OF COMMODITY DERIVATIVES IN TOTAL TRADING VOLUME



Source: World Federation of Exchanges

Next, we consider examples of international experiences that may be relevant for Ukraine.

THE CEEMEA (CENTRAL AND EASTERN EUROPE, MIDDLE EAST AND AFRICA) REGION

From among more than two hundred organizations in the CEEMEA (Central and Eastern Europe, Middle East and Africa) region that call themselves "commodity exchanges", only a few could be regarded as being relatively developed (in Hungary, Romania, the Russian Federation and Turkey), that is, offering derivatives trading (as opposed to auction-like spot trading)[82]. But even in such markets, the volume of trade in agricultural produce is low. A few more exchanges have a certain capacity for developing trade in agricultural produce.

The region's exchanges face the problem of inefficient legislation, including the inability to ensure an effective delivery mechanism based on warehouse receipts, inadequate regulation of exchanges

The region's exchanges face a typical problem of inefficient legislation and regulations, including the inability to ensure an effective delivery mechanism based on warehouse receipts, inadequate regulation of exchanges, and restrictions imposed by trade policies (such as restrictions on export of agricultural products)[83].

Constraining factors in the development of a contemporary model of trading in agricultural derivatives include:

- setting up an exchange-traded spot market, ignoring the derivatives market,
- the idea that physical delivery is not important for the derivatives market,
- failure to understand the key role of the derivatives market in limiting price risks and ensuring transparent pricing,
- failure to understand that the exchange, apart from the trading mechanism, must also provide a range of services for market participants in order to make this market attractive to them (such as neutralizing the risk of non-performance by counterparties; product quality assessment; access to finance; conflict resolution mechanisms, etc.).

[82] Alexander Belozertsev, Lamon Rutten and Frank Hollinger. Commodity exchanges in Europe and Central Asia: A means for management of price risk. FAO INVESTMENT CENTRE Working Paper, 2011.
[83] Alexander Belozertsev, Lamon Rutten and Frank Hollinger. Commodity exchanges in Europe and Central Asia: A means for management of price risk. FAO INVESTMENT CENTRE Working Paper, 2011.

Case 2. Budapest Commodity Exchange.

The Budapest Commodity Exchange (BCE, integrated into the Budapest Stock Exchange since 2005) was a prominent example of a derivatives market for agricultural products (primarily grain). In the second half of the 1990s, the Exchange managed to create a relatively developed grain futures market, introducing a futures option in 2001. Despite certain success, the market was not organized optimally, exposed to the problems of quality, late deliveries, an imperfect system of warehouse receipts, etc. Beginning in the 2000s, trade in grain contracts was phased down, caused primarily by Hungary's accession to the EU and waning demand for exchange-based risk-limiting instruments on the part of the farmers, as they were gaining access to the guaranteed minimum price program available in the EU.

Another factor that hinders trade in agricultural derivatives on the BSE is low activity in the derivatives market by small (up to 5 hectares) farmers who dominate Hungary's agricultural business.

Source: Alexander Belozertsev, Lamon Rutten and Frank Hollinger. Commodity exchanges in Europe and Central Asia: a means for management of price risk. FAO INVESTMENT CENTRE Working Paper, 2011

Among the countries attempting to set up an exchange-based market for grain, mention should also be made of Romania that strives to establish a liquid and transparent market, introduce efficient market price indicators, and reduce transaction risks for its participants. Romania has a significant export potential in grain trade and competes with Ukraine on the European and North African markets. Romanian Commodities Exchange currently offers spot and forward contracts and aims to introduce futures and options. The exchange has only 1,500 customers and trades in small volumes.

In Turkey, market liberalization and reduced government support for the agricultural sector over the past decade have raised the issue of limiting price risks and the development of derivatives trading[84]. The basis for introducing derivatives trading was the implemented regulation of electronic warehouse receipts, creating prerequisites for deliverable futures.

Case 3. Turkey: Izmir Commodity Exchange and Turkish Derivatives Exchange (TURKDEX)

Izmir Commodity Exchange is Turkey's largest agricultural exchange (with annual trading volume of USD3.5 billion)[85] where spot trading, primarily in cotton and some other crops (raisins and oil crops), takes place; the Exchange offers no derivatives trading.

The Turkish Derivatives Exchange (TURKDEX) was set up in 2005 as a partnership of 17 founders and became part of Borsa Istanbul (BIST) in 2013. Despite numerous statements by the Government and the Exchange about the need to develop the derivatives market for agricultural products, the wheat and cotton derivatives market remains both small in terms of volume and illiquid (compared to other derivatives markets that are considerably more liquid at Borsa Istanbul). Experts cite insufficient demand for these instruments on the part of the agricultural market participants who are traditionally inclined to spot trading, as well as their unawareness of derivatives trading, among the key reasons for slow development of the agricultural derivatives market.

[84] N. I. Kucukcolak. Evaluation of Commodity Market Experiences: More Than a Design Issue. https://www.econjournals.com › index.php › ijefi › article › download › pdf
[85] http://itb.org.tr

THE BRIC COUNTRIES (BRAZIL, RUSSIA, INDIA, CHINA)

BRAZIL

In Brazil, derivatives are traded trading on B3 (Brasil Bolsa Balcão S.A.[86]), an exchange that in 2008 took over the Brazilian mercantile exchange BMF (BMF, in turn, merged in 1997 with the Brazilian Futures Exchange). Consolidation of stock trading on B3 and alliance with CME Group were among the key factors in the development of derivatives trading. Today, B3 is one of the world's largest exchanges in derivatives trading in agricultural produce. The B3 exchange trades in ethanol, coffee, corn, sugar, soybean, and live cattle contracts. The annual volume of derivatives on agricultural products traded on B3 exceeds USD9.5 billion (more than 1.7 million contracts)[87].

Unlike many other markets, the Brazilian exchange market is a one for trading between dealers who in turn enter into OTC contracts with their clients (these OTC contracts are registered by the exchange). Clearing of contracts is carried out by a clearing institution, and performance under contracts is ensured by margin payments made by participants on open positions (at 3 to 10% of the contract volume), as well as by a multi-level system for guaranteeing the execution of transactions (the market participant is responsible before the broker, the brokerage firm — before the clearing institution at the exchange, while the exchange ultimately ensures the exercise of contracts by the guarantee fund).

RUSSIA

In Russia, numerous attempts to set up a liquid market for agricultural derivatives have failed so far to produce any significant results. Among relatively notable efforts was an attempt to create a deliverable futures market (mostly on grain) under the National Mercantile Exchange (founded in 2002 and later merged with the Moscow Exchange). The first failed attempt to start trading occurred in 2008, followed by the second one in 2017, ending in the suspension of trading following numerous instances of shortage of grain discovered at the silos. A new attempt to launch trading in grain futures in 2020 was announced recently. At present, the only agricultural contract on the Moscow Exchange is a non-deliverable futures contract on sugar, trading in which is insignificant.

The Brazilian exchange market is a one for trading between dealers who conclude OTC contracts with their clients (the OTC contracts are registered by the exchange). Clearing of contracts is carried out by the Clearing Chamber, and performance under contracts is ensured by margin payments made by participants on open positions.

The reasons behind the failed launch of agricultural derivatives in Russia include:

- lack of interest from the agricultural market participants, the market participants' low awareness of derivatives trading and the benefits it can offer them,
- significant market power held by some market participants,
- high transaction costs (both direct, such as commission fees, the cost of insurance premiums, etc., and indirect, such as costs associated with the risks of failure to deliver physically under contracts),
- the lack of liquidity because of a limited number of market participants,
- significant impact on the market by the government — the largest and most influential market participant that sets the rules of the game and affects prices considerably with its actions,
- unreliable delivery mechanisms, the lack of efficient legislation on warehouse receipts,
- the undeveloped exchange infrastructure.

INDIA

The Indian derivatives market for agricultural products, along with the Chinese one, is among the world's largest. Trading boomed in the 2000s after a number of reforms introduced by the government, mostly focused on liberalization of the agricultural market and lifting a ban on futures trading for a number of products.

[86] http://www.b3.com.br
[87] https://www.ceicdata.com/en/brazil/b3-futures-agricultural/futures-agricultural-turnover-value-usd

India's largest commodity exchange is Multi Commodity Exchange of India (MCX)[88] that, with its daily turnover exceeding USD2.5 billion, occupies more than 80% of the Indian commodity derivatives market, significantly outperforming the state-owned NMCE, NCDEX, ACE, and other exchanges. Contracts for palm oil, spices, cotton, etc., are traded at the MCX.

Among the success factors in the development of derivatives trading in India was the support from international organizations that helped the government and exchanges revolutionize the structure of exchange trading by lifting regulatory obstacles and ensuring the establishment of nationwide exchanges instead of smaller regional ones, as well as by implementing professional management of the exchanges.

Among the success factors in the development of derivatives trading in India was the support from international organizations that helped the government and exchanges revolutionize the structure of exchange trading by lifting regulatory obstacles and ensuring the establishment of nationwide exchanges instead of smaller regional ones, as well as by implementing professional management of the exchanges. Following the reforms, India's national exchanges have been increasingly acting as reliable and neutral trade facilitators, instead of being tools for manipulation or for serving local interests of certain member groups.

Among the factors that constrain further development of derivatives in India analysts cite government intervention in the agricultural market (in particular, restrictions on trade in certain goods, taxation of trade transactions), the lack of a sufficient number of warehouses, extensive and efficient system for product quality control and standardization.

CHINA

The Chinese derivatives market is one of the largest in the world and continues to grow. One of the key success factors was the market reforms implemented in the 1990s, as a result of which[89]:

- The number of exchanges was reduced (from 50 to 14 at the first stage, and then — to 3): at present, the principal markets include the Dalian Commodity Exchange (DCE), the Zhengzhou Commodity Exchange (CZCE), the Shanghai Futures Exchange (SHFE), and the China Financial Futures Exchange.
- The number of contracts was reduced (down to 35 at the first stage, and then only to 12), specialization of the exchanges on the most liquid contracts for standardized products.
- Centralized regulation of trade by the Securities Regulatory Commission, which raised the bar for the market participants' capital and professionalism, curbed the opportunities for price manipulation.

TABLE 18. NUMBER OF AGRICULTURAL PRODUCE CONTRACTS ON CHINA'S EXCHANGES

Contract	Exchange	2017	2018
soybean meal futures	DCE	162,877,864	238,162,413
rapeseed meal futures	ZCE	79,736,545	104,361,264
apples futures	ZCE	793,933	99,956,445
corn futures	DCE	127,323,949	66,812,732
white sugar futures	ZCE	61,073,198	64,004,805
cotton #1 futures	ZCE	54,504,169	58,538,591
soybean oil futures	DCE	57,158,378	54,135,551
palm olein futures	DCE	68,046,475	44,344,644
rapeseed oil futures	ZCE	25,994,757	35,083,678
soybean #2 futures	DCE	42,551	24,476,720
soybean #1 futures	DCE	26,324,058	22,111,727

Source: Futures Industry Association

Gradual opening up of trade to foreign participants has recently become one of the most important trends in the Chinese market. Trading volumes and liquidity of the Chinese market will significantly grow if this trend continues.

- Setting up reliable mechanisms to ensure delivery (almost all commodity contracts provide for delivery upon expiration), including a system of accredited warehouses, which comply with strict requirements imposed by the exchanges, for physical storage of goods.

The exchanges that specialize in contracts for agricultural produce include the Dalian Exchange (soybean, grain, soybean fodder, beans, rice, etc., contracts) and the Zhengzhou Exchange (wheat, corn, soybeans, kidney beans, sesame, etc.). At the same time, the exchanges that originally specialized in agriculture are currently expanding the list of contracts by introducing trade in products from other industries (power, building materials, chemical).

[88] www.mcxindia.com
[89] "China is working to change global commodities trading — to its own benefit": https://www.cnbc.com/2018/06/06/china-is-working-to-change-global-commodities-trading.html.

- Gradual opening up of trade to foreign participants has recently become one of the most important trends in the Chinese market. Trading volumes and liquidity of the Chinese market will significantly grow if this trend continues.

REPUBLIC OF SOUTH AFRICA (RSA)

The agricultural derivatives market was established in South Africa in 1995 and has been energetically expanding in recent decades. The emergence of the futures market was prompted by the agricultural sector liberalization in 1995 and the need to limit price risks because of the volatility largely caused by climate variations and currency fluctuations.

The Agricultural Markets Division of the South African Futures Exchange (SAFEX; bought out by the Johannesburg Stock Exchange (JSE)[90] in 2001) was established in 1995. A deliverable contract for beef was the first to appear, soon followed by a potato contract (trading in both contracts ceased because of the lack of activity). The first successful contracts were the white and yellow maize futures. In November 1997, trading in wheat began, and, in 1999, — in sunflower seeds. In 1998, options trading was launched. Along with the agricultural derivatives market, markets for currency and interest rates contracts were developing dynamically.

Among the strengths of the JSE/SAFEX model is the integration of the commodity sector with the financial sector. A key aspect of this is a reliable, secure and extensive delivery system. It is much easier for banks to lend to the agricultural sector at lower interest rates in view of significantly lower risks: first, warehouse receipts may be used as a reliable security; second, prices for agricultural produce are pegged in a liquid and transparent market.

All the contracts for the local agricultural produce on the JSE are deliverable. An instrument to secure the deliveries is the so-called “silo receipt” (similar to the warehouse receipt) — a document in a paper or electronic form, issued by a warehouse operator. At present, 17 registered warehouse operators and more than 200 registered delivery points exist. Prices of derivatives are listed without value added tax, any VAT liability arises only upon physical delivery of the goods.

Along with deliverable contracts, trading in non-deliverable (financial) contracts (corn, wheat, soybean, soybean meal, soybean oil) is provided on the JSE, with settlements effected at the prices established on the U.S. exchanges (CME).

The emergence of the derivatives market in South Africa was mostly due to the following success factors:

- An open and liberalized agricultural market,
- A well-developed physical infrastructure (warehouses, logistics, certification),
- Integration with the financial sector (simultaneous development of commodity and financial derivatives, involvement of financial intermediaries in the market development),
- A significant interest on the part of various market participants (producers, processors, traders, banks, cooperatives, etc.) in using the derivatives, including as a result of continuous training programs.

As noted by the writers of the UNCTAD report[91], among the strengths of the JSE/SAFEX model is the integration of the commodity sector with the financial sector. A key aspect of this is a reliable, secure and extensive delivery system. It is much easier for banks to lend to the agricultural sector at lower interest rates in view of significantly lower risks: first, warehouse receipts may be used as a reliable security; second, prices for agricultural produce are pegged in a liquid and transparent market.

[90] www.jse.co.za
[91] Development Impacts of Commodity Exchanges in Emerging Markets. Report of the UNCTAD Study Group on Emerging Commodity Exchanges. UNITED NATIONS, New York and Geneva, 2009.

MEXICO

For many years, subsidies to domestic producers and importers to support their trade in derivatives (in fact, mostly to buy put and call options) on the U.S. exchanges have been a feature of Mexico's agricultural policy.

Case 4. Mexico: The ASERCA program

The ASERCA program, managed by the Mexican Ministry of Agriculture, bundles contracts from hundreds of producers and traders by subsidizing up to 100% of hedging costs. To be eligible for the program, a candidate must meet certain qualification requirements designed to prevent misusing the program for speculative transactions. In the early 2010s, the government set a goal of reducing the amount of subsidies and transferring most of the burden on the private sector. The maximum subsidy was slashed to 85% of the hedging costs, while farmers were given an opportunity to select themselves the time for executing derivative transactions. Although farmers must cover a portion of the hedging costs, they are also granted access to financing of these transactions. In 2012, the government set up a special USD41 million fund operated by FIRA (the government's agricultural financing agency), designed to finance hedging transactions by Mexico's agricultural market participants[92].

With ASERCA in place and a well-developed derivatives markets for agricultural produce available in the United States, the demand for setting up Mexico's own derivatives market was almost non-existent. At the Mexican Derivatives Exchange (MexDer)[93], established in 1998 and currently in the world's top 20 derivatives exchanges, financial derivatives are mostly traded.

UNITED STATES OF AMERICA

Historically, the U.S. is a country with the most developed derivatives industry. In 1848, after the opening of the Michigan-Illinois canal, farmers gathered in Chicago after harvest to sell their grain. Prices were low because of large supply after the harvest, and disputes over grain quality often occurred. The same year, a group of 82 enterprising merchants founded the Chicago Board of Trade (CBOT).

The key objectives in establishing the CBOT were to regulate the grain trade market, introduce quality standards, create a fair grain price indicator available to all market participants, and design a tool to limit price risks when grain prices become highly volatile.

The first grain trade was performed in 1851 and, in 1865, CBOT launched trading in standardized commodity futures. In the same year, CBOT imposed a requirement on buyers and sellers to pay collateral or margin to avoid frequent defaults under their contractual obligations.

TABLE 19. MAJOR AGRICULTURAL PRODUCE CONTRACTS ON THE U.S. EXCHANGES

Contract	Exchange	2017	2018
corn futures	CME	89,876,782	97,387,154
soybean futures	CME	54,504,169	58,538,591
sugar #11 futures	ICE	30,961,148	37,011,007
wheat futures	CME	33,717,805	36,805,171
soybean meal	CME	25,996,399	31,838,906
soybean oil	CME	30,232,316	31,265,884
corn options	CME	23,884,970	25,542,064

Source: Futures Industry Association

In 1925, the CBOT clearing institution was established to ensure financial stability of the exchange.

In 1898, a new competitor for CBOT, the Chicago Mercantile Exchange (CME), appeared.

Until financial futures were introduced in the early 1970s, grain futures contracts remained CBOT's main products.

[92] https://www.reuters.com/article/mexico-hedging-idAFL2E8J1ITS20120801
[93] www.mexder.com.mx

Both exchanges were founded as non-profit membership organizations, although later, in 2000, a decision was made to incorporate CBOT to facilitate the exchanges' development, giving an impetus to its subsequent growth. In 2007, CBOT and CME merged, creating CME Group that, since 2008, has taken over NYMEX (energy and other derivatives), COMEX (metals and others), Minneapolis Exchange, and the Kansas City Board of Trade, becoming the world's largest derivatives exchange. CME Group's market capitalization has reached USD25 billion. CME Group's only competitor in the U.S. market is ICE USA that took over the New York Coffee Sugar Cocoa Exchange (cocoa, sugar, orange juice, cotton) in 2007.

The development of the successful derivatives market in the U.S. was based on the following factors:

- numerous interested market participants,
- consolidation and a small number of exchanges,
- standardized contracts,
- the development of efficient margin rules (trading rules that ensured performance under contracts),
- a financially sound clearing agency,
- overall confidence in the financial system,
- adequate government supervision that, at the same time, is not too excessive,
- self-regulation in the derivatives trading sector, ensuring effective arbitration and dispute settlement mechanisms for the market participants,
- a well-developed institution of advisory brokers,
- an ongoing client education and training carried out by the exchange and advisory brokers.

Case 5. USA: The Option Pilot Program (OPP)

In 1987, the United States Department of Agriculture (USDA) implemented the so-called Option Pilot Program (OPP). The Program was developed to determine whether farmers would be able manage the risk of lower grain and oilseed prices using options that they are traded on a regulated U.S. exchange. The options, the cost of which was reimbursed by the USDA, entitled farmers to sell grain at fixed (profitable) prices for a period of up to 6 months. The U.S. Congress regarded the OPP as a potential alternative to the USDA program of financial support to farmers.

The Program had existed for 8 years, facilitated the development of trading in options, but was discontinued, despite being regarded as a success by experts. The reason for it was that farmers, in order to participate in the OPP, had to withdraw from all government subsidy programs. Because of restrictions on the OPP volume, many farmers were left out; not all the produce grown by the farmers is covered by liquid financial options markets; a few other reasons also played their role.

The result of the pilot project was the understanding that the OPP or similar market-oriented programs may eventually replace government farm subsidy programs and achieve objectives with less cost for U.S. taxpayers. The United States has thus shown that targeted assistance to farms is not a universal solution to achieve a better and growing market.

The market development was facilitated by an alliance between advisory brokers, agricultural insurance agents and banks, all of whom were interested in reducing, through application of derivatives and other risk management tools, the risks faced by the farms.

SUMMARY OF THE INTERNATIONAL PRACTICE REVIEW

TABLE 20. DRIVERS IN THE DEVELOPMENT OF DERIVATIVES TRADING AND CREATION OF LIQUID MARKETS GLOBALLY

Macroeconomic	Technological	Institutional
The size of the economy as a whole and the size of the agricultural sector in particular: • Emergence of liquid markets is more likely in a large economy with a significant agricultural sector and numerous participants	**Well-developed modern techniques of product standardization**	**Setting up the exchange as an independent non-governmental organization:** • Subject to proper regulation of its activities by the regulator
Well-developed financial sector: • Well-developed financial markets are in place • Access to finance for market participants • Liquidity of other financial market segments	**Efficient mechanisms of:** • Trade • Clearing • Settlements at the exchange, based on modern technologies	**Concentration of trading:** • Multiple exchanges are not conducive to liquidity • Low trading volumes cannot ensure financial stability for the exchange and high quality of its services to organize and support reliable trading
Effective regulation by the State: • Efficient prudential supervision to prevent fraud and price manipulation • Supporting reliable functioning of the market • Principles-based regulation	**Reliable delivery mechanism:** • Guaranteed delivery creates the necessary link between the spot market and the derivatives market, ensuring effective pricing and confidence on the part of market participants	**Low transaction costs for market participants**

Source: Own interpretation

Global experience of trading in agricultural commodity derivatives shows that the factors that contribute to the development of fixed-term trading can be divided into three categories: macroeconomic, technological, and organizational (Table 20).

By contrast, factors that hamper the development of derivatives trading include:

- Government intervention in the market (such as restrictions on foreign trade, price regulation, and government price support programs),
- Inefficient taxation of transactions on the derivatives market,
- Lacking or insufficiently developed exchange infrastructure,
- No effective regulation of warehouse receipts,
- Market (monopoly) power of major market participants (the ability to influence and manipulate prices),
- Insufficient awareness and knowledge of the derivatives trading potential on the part of market participants.

Research on derivatives markets suggests that:

- Should a liquid market be created, the derivatives market may adequately function as a mechanism for pricing and for reducing risks.
- It cannot be argued that the derivatives markets and speculative transactions in such markets necessarily entail higher fluctuation (volatility) of prices. These hypotheses largely remain unsubstantiated.[94]
- Availability of a liquid derivatives market facilitates lending to agricultural producers, since it reduces risks for lenders.

The U.S. agricultural deliverable derivatives can be used in Ukraine as a model for setting up a mini version of the Chicago Stock Exchange with corn, wheat, barley, sunflower seed, or soybean futures/option contracts. At the same time, developing and advancing the hryvnia-dollar contract is necessary to meet the market's needs in reduced currency risks.

Such information can be proven vital for developing Ukrainian commodity market. Knowing the ups and downs of any other market is a benefit. Ukraine should look for ways to purchase or develop software for trading and post-trading for grain derivatives. Education wise, according to the survey results above – producers are willing to receive additional information, while traders are already quite knowledgeable on hedging methodologies. The most challenging part is, however, setting up the market institutionally and finding the proper balance between market development and government regulations, which, can be achieved if sufficient number of market participants are involved and there is the productive dialogue between them and the policy makers.

[94] Donald Lien & Mei Zhang. A Survey of Emerging Derivatives Markets / Emerging Markets Finance and Trade. Vol. 44, 2008, Issue 2, pp.39 – 69. https://www.tandfonline.com/doi/abs/10.2753/REE1540-496X440203

SECTION 4. CONCLUSIONS AND RECOMMENDATIONS

WHAT THE FARMER SURVEY INDICATES

Among the key findings from the survey of the agricultural market participants, the following should be noted:

- The market participants (producers, processors, traders) refer to price risk as the most significant factor that impacts their business. From the list of potential problems and risks, all three groups of respondents, including 56% of manufacturers, 23% of traders and 37% of processors, point to the price risk as the most substantial one.
- Most producers (especially small ones) sell during the harvest period, when prices are, as a rule, relatively lower than the average annual price — the portion of sales that occur between 1 and 3 months after the harvest is the highest: 55% for grain, 35% for sunflower seed, and 30% for other oilseeds.
- Most producers and processors (except large agricultural holding companies and traders) show extremely low awareness of derivatives-based price risk hedging instruments: only 8% of the producers correctly grasp the concept of hedging, 60% of traders understand hedging correctly, while among processors, only 39% of the respondents have a right idea of hedging.
- The majority of the market participants are enthusiastic about acquiring information and additional knowledge of the opportunities offered by the derivatives market, namely: 74% of the producers are interested in getting additional knowledge about derivatives hedging, 4% of the surveyed traders express their interest, while 80% of the respondents from among the processors would like to find out more.
- The majority of the market participants would consider transacting in the derivatives market, subject to reliability of the delivery mechanism and liquidity of the market. 13% of the respondents would support the idea, if these conditions are met, along with 40% of the manufacturers and 14% of the processors.

These findings indicate the need to develop modern market instruments to hedge price risks, which calls for the development of the respective national vision.

Framework. The goal is to provide market participants with efficient instruments of price risk hedging and to create a transparent market pricing mechanism. This will facilitate the integration of the Ukrainian agricultural market in the global market, and increase competitiveness of the national market. Avenues: (1) allowing access to international markets for hedgers; (2) setting up a national derivatives market.

Stakeholders: (a) agricultural producers; (b) traders; (c) processors; (d) commodity exchange; (e) Ministry of Economic Development, Trade and Agriculture; (f) the NSSMC; (g) the NBU; (h) banks; (i) industry associations; other financial market participants.

Accessibility of reliable and efficient price risk hedging instruments will ensure a number of social and economic advantages, of which the following deserve attention:

- Transparent pricing mechanism for agricultural produce, accessibility of reliable price information.
- Reduced uncertainty of income and expenses for producers and processors. The result is an improved business planning model; the certainty of profit margins will attract additional players and increase competition, thereby spurring further growth in the industry.
- Better funding of production activities and potential reduction of interest rates on loans to producers as a result of mitigated price risks (along with higher certainty of producers' revenues). International experience shows that banks are generally willing to reduce the cost of lending to producers, provided that their revenues are made certain through fixing the price of future sales of agricultural produce. Selling produce at floating prices would not be sufficient to reduce risks for lenders, since acceptable fixed prices for agricultural produce cannot be guaranteed. Market participants will consequently have better access to finance.

Furthermore, having such a market in place would contribute to the development of market infrastructure and more efficient functioning of the spot market, as the growth of exchange trading is usually accompanied by the development of warehouse infrastructure, logistics, better regulation, the establishment of efficient trading and pricing mechanisms, higher professionalism and stronger trust between market participants.

A key prerequisite for establishing a national market of commodity derivatives and ensuring the application of hedging instruments by market participants is a comprehensive educational program that can involve

government authorities, international organizations, industry associations, exchanges, educational organizations. This awareness-raising activity:

- Should cover a wide range of market participants — producers, processors, and traders. Special attention is to be paid to engaging medium and small-sized market participants in educational programs in order to create equal conditions for access to hedging opportunities compared to larger companies.
- Not only should provide high-quality education on hedging risks and inform about the opportunities offered by the use of derivatives, but also contribute to changes in the market participants' perception of present-day market instruments for managing price risks.

As part of awareness-raising activity, the following may be recommended:

- Develop hands-on educational materials, including situational exercises (case studies) based on Ukrainian examples.
- Design short-term educational programs for different categories of market participants; holding regular workshops across all Ukrainian regions.
- Creating high-quality Internet resources offering educational materials and up-to-date market information.

HEDGE ON INTERNATIONAL EXCHANGES OR DEVELOP OWN COMMODITY EXCHANGE?

Among the market participants, discussions continue around two ways to ensure their access to hedging instruments and two ways to set up market risk hedging mechanisms through market instruments:

(1) Providing easy access for domestic participants to the world's leading exchanges;
(2) Setting up a national derivatives exchange.

We believe that both opportunities should be developed. A national exchange could create an internal price benchmark in the national currency. Meanwhile, international markets already offer hedging opportunities in the liquid market.

CREATING OPPORTUNITIES FOR EASY AND CHEAP ACCESS TO INTERNATIONAL DERIVATIVES MARKETS

A way to ensure the market participants' access to market instruments of price risk hedging is to trade agricultural derivatives on leading international exchanges (such as CME).

Today, CME Group, the world's leading exchange, trades contracts created on the basis of prices for Ukrainian agricultural produce[95] (see contract specifications in the Appendices below):

- Black Sea sunflower oil futures.
- Black Sea corn futures and options.
- Black Sea wheat futures and options.

Compared to establishing a local domestic market, trading on global exchanges offers several benefits:

- *Liquidity.* Contracts executed on the world's leading markets are overwhelmingly much more liquid. In practice, this makes price manipulation impossible, while guaranteeing opportunities for closing open positions.
- *Protection.* Effective government regulation and efficient protection of the rights of market participants.
- *Reliability.* The mechanisms that ensure performance under contracts on the world's leading exchanges have been developed for decades, making the discharge by parties to the contract of their obligations absolutely reliable.
- *Modern technologies* that support convenient and easy transactions on the market.

Downsides of hedging on global markets include:

- Basic risk, i.e., the risk of divergent price fluctuations on the spot and terminal markets, which may be caused by non-market forces (dissimilar trends in the domestic and foreign exchange markets).
- Difficult access for Ukrainian participants (especially for small-sized ones) to international markets due to the lack of awareness on the part of the domestic participants about the transaction procedures in these markets, along with communication problems in liaising with foreign brokers.
- The presence of currency risk embedded in contract price.

[95] https://www.cmegroup.com/trading/agricultural/grain-and-oilseed/black-sea-wheat-financially-settled-platts_quotes_volume_voi.html#tradeDate=20200122

Recommendations:

- Communicate to market participants the opportunities and benefits offered by international markets.
- Hold consultations with the NBU and banks on the actions required to simplify the rules for transferring funds abroad to broker accounts for the purpose of hedging transactions. A possible way to address the problem may be to arrange for a special training course (brief workshop) for the banks' employees in charge of transfer of funds by hedgers to the foreign brokers' accounts.
- Hold consultations with the State Tax Service of Ukraine on streamlining the taxation rules for hedging transactions carried out on global markets, about simpler rules for offsetting profits and losses from transactions on the physical market and the derivatives market, and tax separation for hedging and speculative transactions. Following the consultations, draft amendments to the Tax Code of Ukraine should be prepared.
- Hold consultations with foreign exchanges (including CME) and brokers on making it easier for Ukrainian hedgers to open accounts and on facilitating access to the global market for Ukrainian participants (since foreign brokers are currently reluctant to work with Ukrainian customers). International exchanges are interested in expanding the Ukrainian hedgers' participation in the market and can potentially reverse the brokers' negative attitude to customers from Ukraine.

CREATING A LIQUID DOMESTIC COMMODITY DERIVATIVES MARKET

Global experience suggests that efforts to create a liquid domestic market for commodity derivatives may not always be successful, which is why certain countries (such as Egypt), upon becoming aware of the difficulties and challenges associated with setting up a domestic market, have abandoned such attempts.

TABLE 21. A LOCAL MARKET OR AN EASIER ACCESS TO INTERNATIONAL MARKETS?

Features	Contracts in international markets	Local market
The time to set up appropriate regulation and infrastructure	Provided they act fast, domestic participants can gain easier access to global markets soon enough, i.e., within a few months.	It would take considerable time (2–3 years) to create a balanced legislative framework, market infrastructure and trading technologies to achieve a minimum essential level of liquidity.
Liquidity	Is ensured by the global nature of the market and evidenced by a long history of operation	It will take much time to establish a truly liquid market.
Reliability	Is guaranteed by reliable mechanisms of trading and government regulation	Massive efforts and a successful record will be needed to ensure domestic participants' confidence in the market.
Financial infrastructure	In place	Is virtually non-existent, requiring considerable effort and investment to create one
Fair market price	The market price for North American contracts sometimes insufficiently correlates with the Ukrainian price. The Black Sea wheat, corn and sunflower seed contracts are non-deliverable, their liquidity is not high enough yet (but may grow considerably, if large number of Ukrainian participants gain access to the market).	National deliverable derivatives ensure much fairer prices, as they are secured by the actual delivery of a commodity (a reliable warehouse receipt). However, to perform a price discovery function, liquidity is required, which can only be achieved over time.

Source: Own interpretation

Under certain conditions, the development of a local agricultural derivatives market may offer advantages over hedging with contracts in major international markets[96]. On the other hand, numerous attempts to introduce local contracts for commodities that are already traded under large liquid contracts in the international exchanges are facing major hurdles. Some exchanges apply the contract licensing approach used by the leading world exchanges, introducing a non-deliverable contract in the national currency, identical to the contract traded on an international exchange.

The key prerequisites[97] are macroeconomic stability and conducive government regulation. These prerequisites, however, are often insufficient.

In particular, any attempts to set up a market would fail if no well-developed financial intermediaries exist in the market:

- The surveyed market participants pointed out that they would be interested in hedging instruments if such were offered by Ukrainian banks. It would be therefore advisable to investigate South Africa's success story that demonstrates the banks' significant stimulating role in the development of the derivatives market: banks help producers to structure their price risk management solutions properly

[96] Development Impacts of Commodity Exchanges in Emerging Markets. Report of the UNCTAD Study Group on Emerging Commodity Exchanges. UNITED NATIONS, New York and Geneva, 2009.
[97] Shim (2006), UNCTAD (2009)

by offering the derivatives market-specific solutions for funding and supporting transactions on the commodity market.

- Without numerous market participants involved both in hedging and speculative transactions, no liquid market could be established; it is therefore important to draw to the market as many players as possible, potentially under government programs.

Other important organizational and infrastructural prerequisites for setting up a liquid domestic market include:

Concentration of trading. Competition between numerous trading platforms is not conducive to the formation of a liquid market. Almost universally, whenever a successful market is established in a developing country, trade gets concentrated across a limited number of trading platforms. If several exchanges operate in a country (e.g., in China), each of them becomes specialized to a certain extent. Promoting competition between exchanges on the national market harms liquidity, also because national exchanges de facto operate in competitive environment of the global market. Thus, both the state policy and actions by other persons concerned must focus on setting up a single centralized market whose operation should meet the interests of all stakeholders.

Liquidity is the key success indicator of the derivatives market. In an illiquid market, individual participants can easily influence price movements even with small-volume transactions, which offers scope for price manipulation. With liquidity lacking, participants are unable to open positions and to close open positions easily, resulting in significant losses, thereby affecting the confidence and interest in the market. The price in an illiquid derivatives market will not be sufficiently correlated with the spot price, making effective hedging impossible.

Contracts may become successful (liquid) only if they are significantly different from those that are already traded on the well-developed global derivatives markets. In Ukraine, such contracts, for example, may include contracts for sunflower seed and oil, as well as barley. If similar contracts already exist on the global market, a national contract can be successful if there is a significant basic risk in the national spot market against the futures price on the global market.

The example of South Africa (JSE) shows that the introduction of non-deliverable contracts in national currency, which are linked to CME prices, may represent an effective solution in creating efficient hedging tools for domestic participants. This approach offers the following benefits: (1) no obstacles to currency regulation, (2) no need to execute contracts with foreign brokers, (3) no currency risk.

Generally speaking, only those types of contracts should be introduced in the local market which have real prospects of becoming sufficiently liquid. For Ukraine, this primarily means corn, wheat, sunflower seed, barley, soybean, and rape contracts.

Apart from the above-mentioned factors, important elements of a liquid market include:

- A wide range of market participants being aware of the opportunities offered by the derivatives market and trading technologies.
- Free access to the market not only for domestic farmers, but also for foreign participants.
- Low transaction costs (both direct and indirect).

GOVERNMENT PROGRAMS TO SUPPORT THE USE OF MARKET HEDGING INSTRUMENTS BY PARTICIPANTS

The individual countries' (USA, Mexico) experience indicates a positive effect of government programs intended to support hedging transactions by producers and processors on the derivatives market. For example, financing from a state fund to purchase put or call options might contribute to the development of a liquid market and is a more efficient means of protecting market participants against market risks, compared to the direct "buffer" transactions with the state commodity reserves or other ways of supporting the producers directly.

INFRASTRUCTURE CHANGES REQUIRED TO DEVELOP THE DERIVATIVES MARKET

TABLE 22. THE FINANCIAL INFRASTRUCTURE REQUIRED FOR DERIVATIVES MARKET IN UKRAINE

	Pre-trade	Trade	Post-trade		
	Market participants	Trading platforms	Central counterparty	Central depository	Trade repository
What we have so far	Licensing terms	Licensing terms			-
	Easy opening of (sub)accounts	Terms of access for participants		Terms of access and requirements for participants	-
				State-of-the-art technical facilities in accordance with EU requirements	-
What should be done	Additional awareness of the instruments	Develop fixed-term contracts and convert them in an electronic format	Create a central counterparty	Laws harmonized with the MiFIDII, EMIR, CSDR standards	Create a trade repository
			Laws harmonized with the MiFIDII, EMIR, CSDR standards[98][99]		
	Availability of instruments	State-of-the-art technical facilities	State-of-the-art technical facilities to record positions, clear derivatives, etc.	Market rates	Introduce legal regulation of its activities
	Technical support and liaison	Competent personnel in place to initiate contracts	Competent personnel in place to review and clear transactions	Coherent risk management policy	State-of-the-art technical facilities
	Access to money market and/or cheap resources	Standardized data exchange	Standardized data exchange	An account opened with the NBU	Coherent rules of liaison with regulators and participants
		Market rates	Market rates		Market rates
			Coherent risk management policy		

Source: Own interpretation

AGRICULTURAL MARKET INFRASTRUCTURE

Setting up a successful derivatives market for agricultural produce is generally accompanied by putting in place and developing the associated infrastructure, such as a certified warehouse network, a quality control system, supply channels. Creating an infrastructure for the free flow of electronic warehouse receipts would significantly facilitate the introduction of the deliverable derivatives market. This is demonstrated both by the positive and by the negative international practices discussed in Section 3.

AGRICULTURAL MARKET INFRASTRUCTURE

Functioning of derivatives markets in Ukraine depends on numerous factors. They include the respective market infrastructure comprising pre-trade, trade, and post-trade components.

pre-trade: includes the participant's compliance with licensing terms. Besides, the participant must have operational and uninterrupted access to the trading terminal, along with the respective (sub)accounts opened with the CCP and CSD[100], and must have funds for margin payments. Traders at present lack new liquid instruments, including fixed-term contracts. Technical interface between the exchange and infrastructure components is outdated and requires further automation. Furthermore, traders must have permanent and fast access to the money market.

[98] MiFIDII means the 2004 EU Markets & Financial Instruments Directive, available at https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:145:0001:0044:EN:PDF
[99] EMIR means the EU European Market Infrastructure Regulation, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0648
[100] A central depository is

trade: the key infrastructure component is the exchange (both national and international). Today, exchanges do exist, but, because of their fragmentation, they are unable to concentrate sufficient liquidity. The EU's latest practices should be implemented. Exchanges must invest in the deployment of a high-tech trading system.

post-trade: the central counterparty is an institution that provides clearing and manages risks. The main requirements for the CCP include its compliance with the risk management policy standards described in the EU's MiFID II and EMIR regulations that must be implemented in the Ukrainian laws. Technological capacity must be in place to support fast information flow between all trading components and the customer's position risk recalculation module. Additionally, the central counterparty's stability will improve if traders' funds deposited as margin payments are accessed automatically. The CCP must keep an account with the NBU for margin payments. The other component is the central depository charged with keeping records of assets on the market. The CSD is responsible for settling the trades using the delivery-versus-payment method, i.e. it concurrently instructs to transfer funds within the payment system and participants' assets within the depository system. The CSD's basic principles and features are described in the EU's CSDR[101] and EMIR regulations that should be implemented in Ukrainian laws. The CSD (i.e., the National Depository of Ukraine) has by now introduced new technological facilities that meet the best EU standards and offer all the necessary capacity. The CSD must keep an account with the NBU for settlements between the trading parties. From the standpoint of the agricultural market itself, a system of communication with authorized warehouses, grain silos and other agricultural market players must be in place.

TABLE 23. THE ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN UKRAINE

Institution	Settlement institution	The need for an EPS	Reasons
Trading parties	NBU	No	-
Trading platforms	-	-	-
Central counterparty	NBU	Yes	Automatic collection of the required funds for risk management and depositing them in the relevant CCP's account with the NBU
Central depository	NBU	Yes	Using the CSD's account with the NBU for settlements between the parties. Optional collection of the party's funds in one bank and their deposition in the CSD's account with the NBU.

Source: Own interpretation

The final post-trade component is a trade repository, i.e., a system for the trading information storage and processing within and without the exchange. This system would improve the quality of analytics and provide the regulator with sufficient information to supervise the participants. Guided by the MiFID II and CSDR standards, the repository should be legally defined. Regulators would thus be able to monitor the level of data transparency for the executed contracts. A modern system of accounting and disclosure to the relevant stakeholders is also needed.

The role of payment and settlement systems in Ukraine's terminal markets should be highlighted additionally. European practices currently emphasize the importance of settlements via the CSD and CCP in central banks[102]. That is why the CSD and CCP accounts are expected to be opened to settle under the "payments with the Central Bank cash" principle. The participants' funds would thus be fully protected, transactions will be carried out continuously and smoothly, which, in turn, would raise the confidence level on the part of domestic and foreign investors. It has been assumed so far that the NBU's Electronic Payment System will be used in Ukraine's stock/commodity markets. It is a well-tested and well-functioning RTGS-class system that is responsible for 97% of interbank transfers within Ukraine[103].

[101] CSDR means the 2014 EU Central Securities Depositories Regulation https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0909

[102] European Central Bank. THE USE OF CENTRAL BANK MONEY FOR SETTLING SECURITIES TRANSACTIONS, MAY 2004. https://www.ecb.europa.eu/pub/pdf/other/useofcbmoneyforssten.pdf

[103] The National Bank of Ukraine. The Electronic Payment System (EPS). https://old.bank.gov.ua/control/uk/publish/article?art_id=53859