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CURRENT STATE, PROBLEMS AND WAYS OF IMPROVEMENT OF MATERIAL AND TECHNICAL SUPPORT OF AGRICULTURAL PRODUCTION

Summary

The analysis of the current state of material and technical support of agricultural production, in particular agricultural machinery, seeds and fuel. Problems of technical equipment of agricultural production are revealed, shortcomings of domestic machine building are pointed out. Ways to reduce the dependence of the equipment market on imports are proposed. A short-term forecast of providing agricultural enterprises with technical means, taking into account the impact of hostilities, has been made. Problems and prospects of development of domestic seed production taking into account changes of climatic conditions of managing are covered. Effective ways to improve the domestic seed system using the tools of state regulation for its further transformation are proposed. The main trends in the world and domestic fuel

market are identified. A short-term forecast of prices and fuel consumption in the agricultural sector of the economy has been made.

Introduction

For the modern development of the economy of developed countries is characterized by high-tech agricultural production, in which the leading place is occupied by providing its material and technical resources. Timely modernization of material and technical base contributes to the sustainable economic development of enterprises. Providing agricultural enterprises with resources that meet the necessary parameters ensures the growth of their financial and economic indicators and the level of competitiveness.

At various times, Ukraine has adopted state programs aimed at stimulating technical and technological renewal and modernization of agricultural production, including agricultural machinery. At present, these programs either do not work at all or do not work in full. Therefore, the question arises how to ensure their continued implementation in full.

Important in the further development of the agro-industrial complex is also breeding and varietal renewal, the creation of a national seed system that can ensure full use of existing genetic potential of domestic varieties and the needs of farmers in high quality seed in a gradual change in natural and climatic conditions.

Provision of fuel and energy resources of the agricultural sector of the economy is an important factor in its efficient functioning and development. Fuel and lubricants play a leading role in cost formation. Their share in the structure of material costs in agricultural enterprises is about 9% (the third largest item of expenditure).

Ukraine is not one of the countries with significant proven oil reserves. Accordingly, Ukraine's economy is characterized by a high level of dependence on imports of fuel and energy resources.

In general, the analysis of the state of technical and technological support of production allows us to draw conclusions about the need to increase its level, identify areas for solving problems, develop necessary measures to revive domestic agricultural machinery, increase the competitiveness of domestic agricultural machinery in domestic and foreign markets, increase production and reduce.

Part 1. Technical support of agricultural production

The state of the agricultural machinery market in 2021 was characterized by gradual economic growth, reduced impact of threats related to the opening of the land market, rising prices for grain and oilseeds, which opened up prospects for dynamic renewal of agricultural machinery with high-performance machinery, both new and and used, which increase the efficiency of agricultural production.

In 2021, after a three-year decline, imports of major agricultural machinery rose sharply to $ 1,138 million. US and almost reached the level of 2017 – 1144 million dollars. USA (Figure 1).

For example, in 2021, compared to 2020, imports increased significantly: tractors from 318.2 to 547.3 million dollars. US, combine harvesters from 155.1 to 283.8 million dollars. US, seeders from 103.2 to 160.3 million dollars. US, plows from 15.7 to 25.9 million dollars. USA. Significant growth in imports is observed in other types of equipment.

Exports of agricultural machinery in 2021 compared to the previous year decreased by 7.4% and amounted to 50.2 million dollars. USA. Of the 75 tractors exported from Ukraine, the customs value was $ 2.9 million. US only 19 tractors worth 990 thousand dollars. The United States was Ukrainian-made. As for the export of combine harvesters, out of 19 units with a customs value of 813 thousand dollars. USA only 1 car of domestic production worth 7.9 thousand dollars. USA. The situation is similar with the export of other equipment, such as seeders. Of the 4,557 units worth $ 20.9 million. In the United States, 1,595 seeders were exported, the customs value of which amounted to only 139.2 thousand dollars. USA.

Renewed in 2017, the Program of partial compensation for the cost of machinery and equipment of domestic production has become a very effective tool for technical and technological renewal of agricultural production and significant support for the national agricultural machinery.

2021 was a successful year for the program: with a budget of UAH 991.35 million, 5,789 agricultural producers were able to purchase almost 30,000 units worth UAH 4,800 million, 209 machine-building enterprises offered 1,7,044 types of machinery and equipment, and UAH 1,783 million in taxes were paid to the budget.

The disadvantage of the Partial Compensation Program is the minimal presence in the list of equipment to be compensated, mini-equipment for small farms and households, as well as the inability to participate in the Program. However, the abolition in 2020 of an additional 15% of compensation for farms limits access to state support for small farms.

The implementation of this program in the future would continue to interest not only agricultural producers in the purchase of domestic machinery, but also by attracting additional funds for domestic machine builders to improve the quality of machinery.

Although according to the Ministry of Agrarian Policy in 2022 the financial volumes of state support should remain at the level of 2021, but due to military actions the implementation of the program is in great question.

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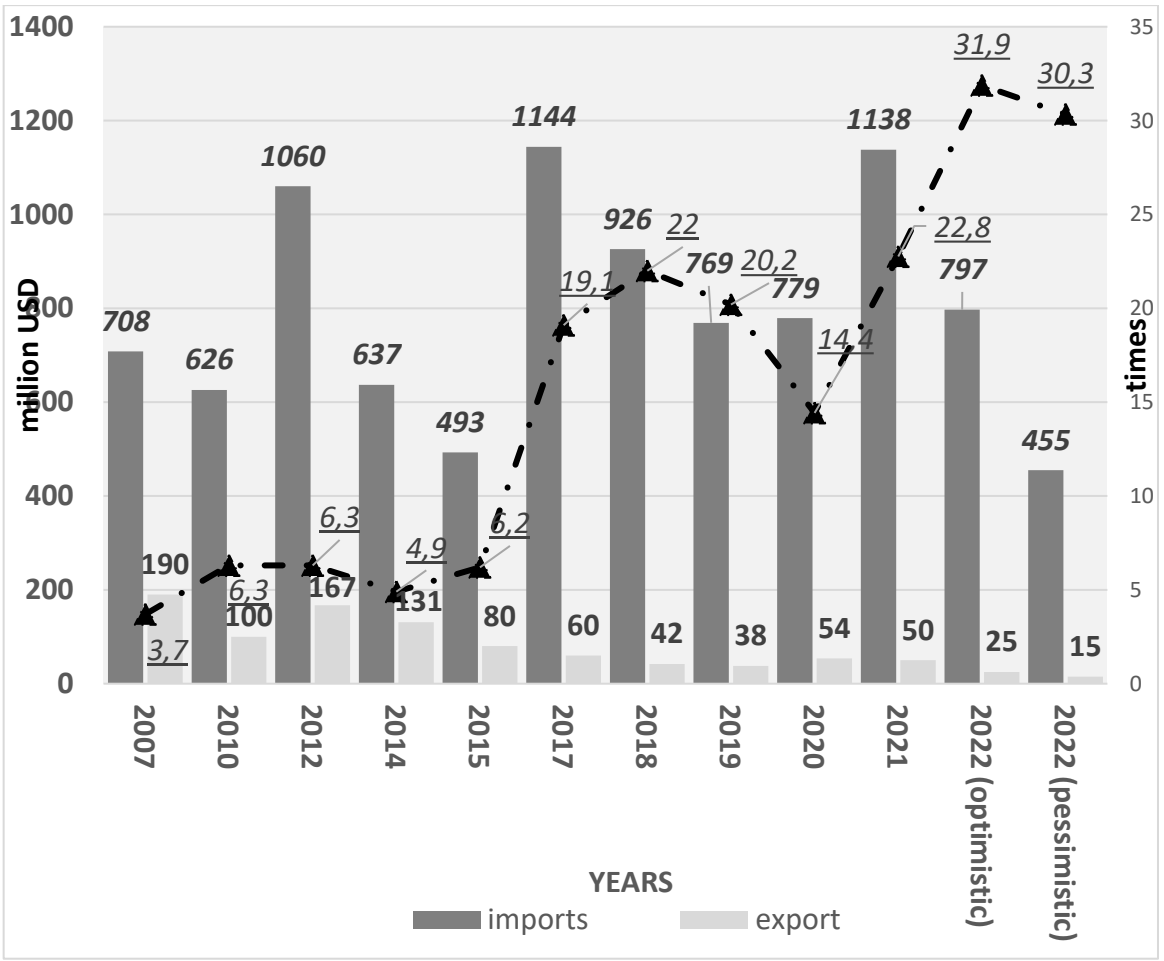

Figure 1. Dynamics import-export basic species equipment, million dollars USA

Source: data of the State Customs Service of Ukraine and the State Statistics Service of Ukraine [1], [2]: 2022 – short-term forecast

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In times of war, it is extremely important for the government to take measures to carry out spring field work in safe regions to prevent a food crisis. The Cabinet of Ministers of Ukraine by Resolution of March 19, 2022 № 324 «On Amendments to the Annex to the Resolution of the Cabinet of Ministers of Ukraine of February 24, 2022 № 153» amended the list of critical import goods. In particular, the following items are included in the critical import according to UKTZED related to technical means for spring field work: 8424 Mechanical devices (with or without manual control) for spraying or

spraying liquid or powdery substances (sprayers and sprays of plant protection products); 8432 Agricultural, horticultural or forestry machinery for soil preparation or cultivation; rollers for lawns or sports grounds (tillage equipment, seeders and planters, distributors of mineral and organic fertilizers); 8701 Tractors (excluding tractors of heading 8709), including tractors for agriculture and forestry [3]. Naturally, in our opinion, during the year the list of critical imports will need to include other items, for example: 8433 Machines or mechanisms for harvesting or threshing crops, including presses for straw or hay; lawn mowers and lawn mowers; machines for cleaning, sorting or culling eggs, fruit or other agricultural produce, other than machines of heading 8437; 8419 in the field of dryers for agricultural products, etc.

To support the spring field work, the Cabinet of Ministers of Ukraine adopted Resolution of March 12, 2022 № 274 «On Amendments to the Resolutions of the Cabinet of Ministers of Ukraine of January 24, 2020 № 28 and July 14, 2021 № 723», which provides introduction of a mechanism for providing soft loans to agricultural producers.

Entrepreneurs who are agricultural producers in accordance with the provisions of the Law of Ukraine «On State Support of Agriculture of Ukraine» can take part in the state support program.

The loans can be used only by small and medium-sized agricultural producers with a turnover of no more than 20 million euros per year, which is equivalent to enterprises that cultivate up to 10,000 hectares.

The maximum loan amount covered by the interest rate compensation is UAH 50 million. Lending is provided for agricultural activities (sowing) for martial law (at 0 percent per annum for martial law, and in case of termination or cancellation of martial law – until the end of the loan term) and the loan is valid for 6 months.

The maximum amount of the state guarantee on portfolio loans is set at 80% (ie in case of impossibility to fulfill the obligations to repay the loan, the state will repay up to 80% of debt obligations).

To obtain a soft loan for agricultural producers need to contact the banking institutions where they are served [4].

Thus, as of May 11, farmers have already received loans for the sowing campaign in the amount of 24 billion 177 million UAH. The main part is traditionally involved in the program of portfolio guarantees of 80% – is 16 billion 460 million UAH.

The proposed measures will help domestic farmers in a timely manner and in full to carry out a set of spring field work in critical conditions of hostilities and ensure a high level of food security in the country.

The most significant threat to Ukraine's economy in general, and to the agricultural machinery market in particular, is the war with Russia, which caused the loss of large areas in the east and south, destruction of production facilities of Ukraine's largest tractor manufacturer – Kharkiv Tractor Plant, loss due to occupation. the only manufacturer of combine harvesters of the Kherson

Machine-Building Plant and a number of other enterprises related to agricultural machine-building. In addition, the economic downturn has led to an increase in the cost of energy: fuel, electricity, gas. This will lead to higher prices for agricultural machinery, spare parts, fertilizers (gas is also a raw material for the production of nitrogen and some complex fertilizers), seeds and planting material. As a result, the cost of agricultural products will increase, which will significantly reduce the profitability of agricultural production, despite the general global trend towards rising food prices. As a result, the threat of intensification of inflation processes will increase, the cost of credit resources will increase, which in the complex will lead to a reduction in the purchase of expensive imported equipment.

The challenge of 2022 was the blockade of Black Sea ports through which a significant part of imported equipment is imported from South and North America and Southeast Asia. As a result, the logistics arm of delivery is growing, which will also increase the cost of machinery, which will lead to the refusal to supply most of the agricultural machinery from these regions.

In addition, threats such as weather and climate (low snow and warm winters of 2021–22 can kill some winters), inflation, military action, threats related to the COVID-19 pandemic, rising prices in agricultural markets and more have not disappeared.

The unconditional negative is the extremely high disparity between imports and exports of agricultural machinery in favor of imports. If in 2007 this ratio was 3.7: 1, which was already negative for the country's economy, then in 2012 this ratio reached 6.3: 1, and in 2021 this ratio reached the highest level of 22.8: 1 and for the last 5 years does not fall below 14.4: 1 (Figure 1). The negative balance contributes to a significant outflow of currency from the country, loss of position of domestic machine builders in foreign markets, migration of skilled labor abroad and undermining the economy as a whole due to the emergence of critical import dependence.

In 2022, given the level of manifestation of existing challenges and risks, as well as a certain cyclical growth and decline in demand for crop equipment, we can forecast its imports and exports in two directions: optimistic and pessimistic.

Given the fact that during the year there will be risks associated with the war, in general, according to the optimistic forecast of falling imports of basic equipment can be expected by 25-30%, exports – by 40-50% (Figure 1).

According to the pessimistic forecast, with the exacerbation of most challenges and threats, the fall in imports could be at least 60% and exports to 70%.

Part 2. Development of seed production in the conditions of climate change

Despite the fact that Ukraine is one of the largest exporters of cereals and oilseeds, a significant share of seeds in the domestic market is of imported origin. In particular, the share of imported sunflower, rapeseed and sugar beet

seeds reaches 70-90%. The annual volume of seed imports is about 0.5 billion dollars. USA. According to experts, the import of seeds of agricultural crops could reach 1.5 billion dollars. USA, and eventually completely displace domestic varietal resources from the market of seeds and planting material, which will threaten the country's food security.

Production of conditioned seeds of basic cereals and oilseeds in 2020 amounted to about 400 thousand tons (additional, basic and certified) with the need of 2500-3000 thousand tons. The volume of conditioned seeds of major cereals and oilseeds of Ukrainian selection was 162.8 thousand t, or 42.2% of the total certified seed. Seeds of foreign selection of 62.0 thousand tons were imported to Ukraine. At the same time, 160.7 thousand tons of seeds of foreign selection were produced and certified on the territory of Ukraine. The total production and import of conditioned seeds of foreign selection in 2020 amounted to 222.7 thousand tons, or 57.8% (Table 1).

At the same time, in recent years there has been a tendency to increase the share of seeds of foreign selection in the seed fund of Ukraine.

Most conditioned seeds of domestic selection are produced in Kharkiv (31.6 thousand tons), Dnipropetrovsk (11.8 thousand tons) and Odessa (7.7 thousand tons) regions, while foreign selection – in Ternopil (11.9 thousand) tons), Khmelnytsky (8.8 thousand tons) and Kyiv (5.2 thousand tons) regions. Moreover, the Kyiv region also receives the largest number of certified foreign seeds from abroad – 0.9 thousand tons, of the total – 1.1 thousand tons, or 80.0%.

In Ukraine, the production of seeds of only certain crops provides an adequate level of food security. In particular, the production of buckwheat, millet, oats, triticale is fully provided by seeds of domestic selection.

The level of seeds of domestic selection of winter wheat production is 66.2%, spring barley – 57.8%, winter barley, spring wheat, winter rye, corn, soybeans, sunflowers, peas and sugar beets – below 50%. The average level of support for the production of grain and oilseeds by seeds of domestic selection is only about 40%.

Significant demand for planting material of foreign selection increases the level of import dependence of the domestic seed market and creates additional risks in agricultural production, in particular due to possible restrictions under quarantine measures in the Covid -19 pandemic. At the same time, the reduction in demand for seeds of national selection is slowing down the development of the industry.

Seeds worth $ 400-500 million are imported to Ukraine annually. The United States, as well as within the state, produces conditioned seeds of foreign selection, financed by foreign companies, for almost the same amount – about $ 500 million. USA. Over time, this may lead to the complete displacement of domestic varietal resources from the market of seeds and planting material, as well as threaten Ukraine's food security.

Table 1

Production of conditioned seeds of major crops in Ukraine in 2020 (additional, basic and certified)

Cultures	Seeds of Ukrainian selection, thousand tons	Seeds of foreign selection, thousand tons		Seeds of foreign selection, thousand tons	Total seeds produced, thousand tons	The share of seeds of Ukrainian selection, %
		imported to Ukraine	made in Ukraine			
Winter wheat	93.6	1.1	46.7	47.8	141.4	66.2
Spring barley	19.3	0.2	13.9	14.1	33.4	57.8
Winter barley	10.5	0.3	10.5	10.8	21.3	49.3
Corn	32.2	24.4	54.4	78.8	111	29
Winter wheat	1	0.4	4.9	5.3	6.3	15.7
Total cereals	156.6	26.4	130.4	156.8	313.4	50
Soy	2.3	0.4	18.7	19.1	21.4	10.7
Winter rape	0.5	3.9	0.2	4.1	4.6	10.2
Sunflower	3.4	31.3	11.4	42.7	46.1	7.4
Total oilseeds	6.2	35.6	30.3	65.9	72.1	8.6
Total cereals and oilseeds	162.8	62.0	160.7	222.7	385.5	42.2
Potato	0.1	2.1	23.2	25.3	25.4	0.5
Sugar beet	0	0.7	0.5	1.2	1.2	0

During 2005–2020, imports of seeds of cereals and oilseeds only increased. At the same time, prices also rose. If in 2005 wheat seeds could be purchased for 333 dollars. US/t, then in 2020 the price rose to 1562 dollars. US/t, or 4.7 times. Soybeans in 2006 cost $ 1,000. US/t, then in 2020 – 1771 dollars.

At the same time, prices for hybrid corn and sunflower increased even more significantly. In 2005, a tonne of hybrid corn cost $ 2,192. USA, in 2020 – already 4496 dollars. US/t, or 2.1 times more expensive. If in 2005 a hybrid sunflower could be bought for 6161 dollars. US/t, then in 2020 – 10703 dollars. US/t, or 1.7 times more expensive (Figure 2).

The increase in the value of imports due to the increase in prices for imported seeds, which are already several times higher than the prices for seeds of domestic selection, has a negative impact on the activities of agricultural producers. Every year, Ukrainian farmers buy 70-75 thousand tons of hybrid corn seeds of foreign selection, 27-30 thousand tons of sunflower, 5-7 thousand tons of rapeseed and 0.6-0.7 thousand tons of sugar beet.

Among the main reasons for the demand for hybrids of foreign selection compared to domestic are the following: higher yields, higher quality seeds of EU and US compared to domestic seeds, trust in foreign seeds due to

counterfeiting in the domestic market, high brand, brand name of EU and US breeding companies.At the same time, with the use of high-yielding varieties of foreign selection, there is an urgent need to intensify the development of domestic selection and increase production in Ukraine of its own varieties, which will increase food security.

Other current challenges include climate change, which is becoming increasingly sensitive and to which Ukraine's agriculture is vulnerable. An increase in the average annual temperature leads to the disruption of ecosystems, the emergence of new diseases and pests of crops, the shift of natural and climatic zones and the formation of a drier climate. According to experts, the frequency of droughts by 2070 will at least double.

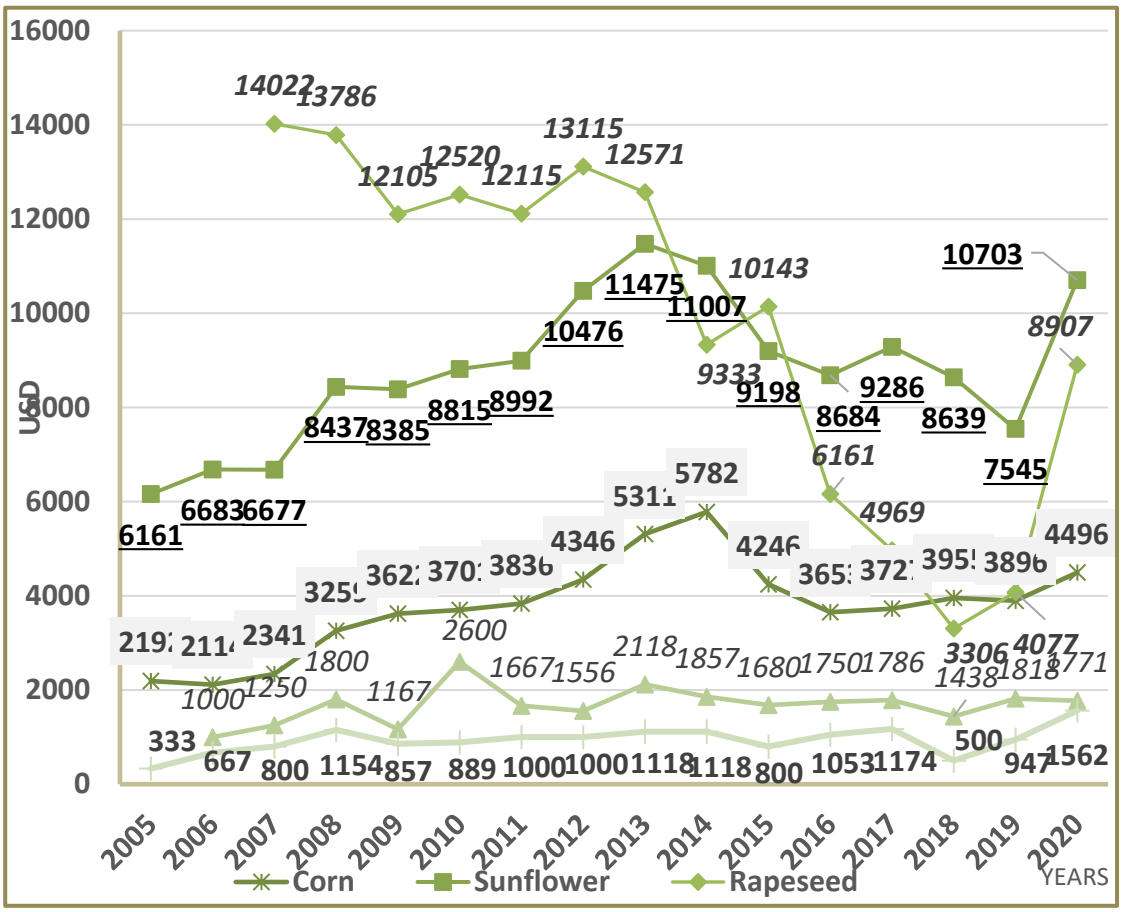

Figure 2. Dynamics of prices for imported seeds of grain and oilseeds, USD without VAT

Source: State Statistics Service of Ukraine [2]

Annually, national and foreign applicants submit from 1,000 to 2,000 applications for qualification examination of plant varieties. According to the registration, about 1,500 plant varieties are received, of which about 70 % are submitted by foreign applicants. At the end of 2020, 8871 varieties and hybrids were entered in the Register of Plant Varieties, of which 4991 (56%) were

varieties of foreign selection and 3880 (44%) were varieties of national selection.

Due to significant climate change, the problem of variety zoning is relevant, as the state registration of varieties does not provide for their zoning, but only recommendations for distribution in large soil and climatic zones – Steppe, Forest-Steppe and Polissya. Placement of varieties without taking into account the peculiarities of agroclimatic subzone can lead to economic losses due to reduced yields and increased costs of growing crops.

The development of national seed production in the future will primarily depend on the organization of the system of collection of selection payments, which should be formed taking into account the world experience. An example is the system of collecting breeding payments in such leading countries as France, Germany and Canada. Thus, the system of sectional payments in France focuses on indicators of sales of grain by farmers. The amount of selection payments here is calculated by the product of the volume of sales of marketable grain by the farmer and 0.7 euros for each ton sold. The amount of selection payments thus determined is transferred to the private selection organization **GNIS**, which controls the quality of the varieties. There, this amount is distributed to the organization **SICASOV,** which controls the payment of royalties and, consequently, selection payments, where these funds are directed to the needs of the breeder. That is, from each ton of grain sold, 0.7 euros is spent on breeding development and innovative research [6].

All developed countries finance from the budget basic research as the most expensive. Private breeding establishments compete to improve discoveries, usually only after a fundamental discovery has been made. According to the laws of most Western countries, only the first breeder of a new variety (hybrid) of seeds receives the right to reproduce and sell. Sufficient state funding, protection of rights to varieties, obtaining royalties, their use provides high protection to the Western breeder in competition, gives the opportunity to actively conduct research. At the same time, competitors get the opportunity to use the results of previous research in their research work. The expectation of the possibility of obtaining monopoly profits greatly accelerates the supply of new and new varieties and hybrids on the market.

If in Ukraine in the near future it is not possible to apply a similar system, it can lead to loss of priorities, chronic backwardness of the breeding industry and the dominance of varieties of foreign selection. Given the lack of budget funding, a radical measure to support and protect the interests of breeding centers and breeders in Ukraine should be to consolidate the introduction of royalties and royalties. Lack of adequate market conditions for legal regulation of relations related to new plant varieties, negatively affects the efficiency of domestic selection, reduces the supply of quality and high-yielding seeds of new varieties and hybrids on the market, ultimately hinders the efficiency of crop production and agriculture in general.

In this regard, it is important to involve all stakeholders, namely: the state, breeders, scientists, seed producers and others: to improve legal norms and aspects of royalty payments in Ukraine, taking into account the experience of their use in the EU and other leading countries; to introduce obligatory declaration of varietal production crops by agricultural producers who own agricultural land with an area of 25 ha and more (for potatoes – from 10 ha); develop a clear mechanism for obtaining royalties based on a realistic reflection of the use of the cost of seeds and planting material; outline and implement state protectionist measures to protect the domestic seed market from foreign expansion; identify further ways to improve the quality of Ukrainian seeds, especially hybrid, where domestic selection significantly loses to foreign; develop and implement mechanisms to combat seed counterfeiting in the domestic market; to develop a state program for the development of domestic selection and seed production.

Part 3. Fuel consumption in agriculture

Currently, the main energy source in the agricultural sector is liquid fuel from petroleum products. Therefore, to a large extent the effective development of agricultural production depends on the sustainable supply of the industry with diesel fuel and gasoline. According to the State Statistics Service, the total fuel consumption of key sectors of the national economy in Ukraine in 1990–2020 ranged from 2.0 to 4.6 million tons of gasoline and from 4.7 to 6.3 million tons of diesel fuel. The largest consumers of gasoline and diesel fuel in the economy of Ukraine are agriculture (over 25% of diesel and 5% of gasoline), industry (15-20% of diesel and 6% of gasoline), transport and communications (19-24% of diesel and 2, 4-4% gasoline) [7]. Among the main consumers of fuel and energy resources, the agricultural sector of the economy occupies a dominant position.

The most widely used types of motor fuel in agricultural production are diesel fuel and gasoline. Their consumption is typical of mobile technological processes that distinguish crop production, and here this type of resource is a priority. The volume of diesel fuel consumption in 2020, although decreased by 71% from the level of consumption in 1990, but in the structure of consumed resources its share increased by 5%, indicating the urgent need to increase supplies of this type of fuel. The volume of motor gasoline consumption decreased 19 times during the analyzed period. Its share in the consumption structure of motor fuels also decreased.

In general, the decrease in the use of gasoline and diesel fuel in agriculture in Ukraine in 1990–2020 can be explained by a reduction in sown areas by almost 13%, growing less energy-intensive crops, reducing almost four times the fleet of cars, tractors and combines, and significant reduction of livestock production [8].

More than 85% of diesel fuel was spent on agricultural work, up to 15% – on transport work. Other works consumed less of this resource. Consumption of gasoline in transport works reached 56% and agricultural – 43.1%.

Table 2 shows the qualitative ratio of individual energy resources in conventional terms, which directly affect the structural changes in their consumption in the industry.

In general, the total amount of conventional fuel used in 2020 amounted to 1.67 million tons and decreased compared to 1990, when it was 9.4 million toe, 5.6 times. The main driver of this reduction was the decline in workload.

Trend to abbreviation consumption fuel in rural economy contributed reduction energy consumption agricultural products. If in 1994 agricultural enterprises spent 44.7 kg of standard fuel per thousand hryvnias of gross output in comparative prices in 2010, in 2018 – only 7 kg, or 6.4 times less.

In the national economy there is a violation of equal intersectoral trade. If in 1990 it was necessary to sell 0.2 tons of grain to buy 1 ton of diesel fuel, in 2020 – 4.8 tons, or 24 times more. The same trend is observed for other types of resources.

The share of fuel in the cost of crop production is 3-4 times higher than the share of fuel in the structure of the cost of livestock products. This is due to the specifics of production and use in the livestock industry of other types of fuel and energy resources, such as electricity and thermal. In 2010–2020, in the whole of agriculture, this share of fuels and lubricants in the cost structure decreased by 55%, including 60% in crop production and 61% – in animal husbandry [8].

Given the dependence of Ukraine on exports of oil and petroleum products, there is a need to find ways to reduce fuel and energy costs to further increase the efficiency of agricultural production. During 1994-2020, the consumption of fuel and energy resources per 1,000 hectares of agricultural land decreased from 203.7 to 65.7 by 3.1 times [8; 9]. However, the cost of oil products per hectare has risen sharply, which has affected both rising oil prices and increasing mechanization density due to the introduction of intensive technologies and increasing crop yields, which once again confirms the increasing technical level of the agricultural sector and continuous improvement of technologies for growing crops and breeding animals.

Increasing the volume of agricultural production is closely related to the provision of agricultural producers and other agricultural enterprises with petroleum products, so there is a need to calculate the need for fuel and lubricants for certain volumes and forecast it for the future.

Volumes of fuel consumption in agriculture will be relatively stable, with a slight increase in the use of diesel fuel. Due to the increase in fuel consumption (9-12%) and rising fuel prices (10-12 %), the cost of fuel is forecast to increase by 15-20%.

Table 2

Dynamics and structure of energy consumption

	Total		Of them:											
			Coal and peat		Natural gas		Petroleum products		Biofuels and waste		Electricity		Thermal energy	
	thousand tons of oil equivalent	%	thousand tons of oil equivalent	%	thousand tons of oil equivalent	%	thousand tons of oil equivalent	%	thousand tons of oil equivalent	%	thousand tons of oil equivalent	%	thousand tons of oil equivalent	%
1990	9395	100	881	9.4	-	-	6064	64.5	-	-	2450	26.1	-	-
1995	2704	100	-	-	-	-	1608	59.5	-	-	1096	40.5	-	-
2000	1538	100	-	-	-	-	1107	72.0	-	-	432	28.1	-	-
2005	2637	100	964	36.6	120	4.6	1273	48.3	-	-	279	10.6	-	-
2010	2027	100	17	0.8	128	6.3	1255	61.9	17	0.8	282	13.9	329	16.2
2015	1957	100	9	0.5	129	6.6	1300	66.4	19	1.0	287	14.7	212	10.8
2016	2139	100	8	0.4	139	6.5	1427	66.7	20	0.9	302	14.1	244	11.4
2017	1847	100	7	0.4	131	7.1	1152	62.4	25	1.4	313	16.9	218	11.8
2018	1907	100	7	0.4	122	6.4	1190	62.4	37	1.9	333	17.5	219	11.5
2019	1890	100	7	0.4	96	5.1	1256	66.5	28	1.5	316	16.7	188	10.0
2020	1669	100	5	0.3	122	7.3	1016	60.9	28	1.7	325	19.5	174	10.4

Source: Based on source data [7]

In 2022, there is a high probability of rising global oil prices, recovery of the world economy and the hryvnia to the US dollar (30.0 UAH per 1 US dollar), which will destabilize the prices of fuels and lubricants for domestic producers, as the share of imported fuel it reaches more than 80%.

It is expected that the volume of diesel fuel consumption in agricultural enterprises in 2022 will increase slightly compared to 2021 (Table 3).

Table 3

Fuel consumption by agricultural enterprises, thousand tons

Type of fuel	Year									
	2013	2014	2015	2016	2017	2018	2019	2020	2021 (Expect)	2022 (ex.)
Gasoline	175.4	149.3	132.8	130.3	125	106	111.3	84.4	96.0	93.1
Diesel	1314.2	1412.6	1255.6	1319.3	1345	1445	1604.3	1314.2	1459.4	1477,9

Source: 2013–2020 – data from the State Statistics Service of Ukraine; 2021–2022 – own calculations

The increase in the use of liquid fuel from petroleum products in 2021 compared to 2020 is due to a sharp increase in imports of agricultural machinery and, accordingly, an increase in the technical equipment of agriculture. However, the use of modern energy-saving tillage tools, which allow combining several technological operations, the use of alternative fuels, optimizing the structure of sown areas with the expansion of low-energy crops, the use of advanced energy and resource-saving technologies in the next (2022) will slow this trend.

The main factors that will affect the prices of fuels and lubricants will be the hryvnia exchange rate against the US dollar, the level of world oil prices and the escalation of hostilities by Russia (Table 4).

The expected increase in prices for fuels and lubricants in 2022 will be 10-12%. But in wartime, the price situation may change in the direction of rising prices.

Table 4

Forecast of retail price for diesel fuel at gas stations in Ukraine

Price per 1 barrel of oil, USD USA		**Exchange rate of 1 US dollar, UAH**		
		28.8	29.4	30.0
Prices for 2021 (fact)	64.89	29.48	30.14	30.80
	78.36	31.09	31.75	32.41
	85.73	31.97	32.62	33.28
Prices for 2022 (forecast)	88.52	32.30	32.96	33.62
	93.5	32.89	33.55	34.21
	98.84	33.53	34.19	34.85

Source: Formed by the author for [10]

The development and implementation of measures to create favorable legislative and regulatory frameworks for the development of biofuels in order to reduce import dependence, reduce the cost and guarantee the provision of agricultural producers with liquid fuels will reduce the impact of negative factors and risks in the field of logistics.

Conclusions

Modern agriculture is impossible without a well-developed material and technical base. Since Soviet times, Ukraine has been one of the recognized leaders in the field of agricultural engineering, and the share of UAAS seeds was over 80%. However, today there is a decline in these important industries and domestic farmers are increasingly using imported machinery – both new and used, and the share of seeds of domestic selection is about 40%.

The market of agricultural machinery, seeds and technologies significantly depends on the development of agriculture in Ukraine. At the same time, the state influences the dynamics and directions of development of the above-mentioned markets both through the regulation of legislation and support for the purchase of domestic machinery and seeds by agricultural producers.

Domestic factories are able to meet the needs of the agricultural sector of Ukraine by more than 15-20%. In addition, domestic equipment is inferior to foreign in terms of technological excellence, quality, reliability and productivity.

The growth of crop production is inextricably linked with the development of the seed industry, which fully realizes the genetic potential of the established varietal plant resources.

Today, a number of factors hinder the realization of the export potential of domestic seed material: non-recognition of Ukrainian phytosanitary certificates, which is exacerbated by Ukraine's incomplete accession to varietal certification schemes, lower quality of Ukrainian seeds compared to EU and US seeds, and strong domestic protection. for entry of foreign, including Ukrainian.

In the long run, seed production in Ukraine should develop along the market path under the conditions of creation and functioning of civilized, transparent, state-regulated market circulation of seeds and planting material and protection of intellectual rights of breeders and breeding institutions.

The functioning of the national market of fuel and energy resources is primarily due to global trends in world energy development, namely oil prices. The dynamics of world oil prices and retail prices for gasoline and diesel fuel at Ukrainian gas stations had the same tendency to decrease or increase in certain periods.

In general, the war has a negative impact on the development of logistics of agricultural production, which on the one hand causes a lack of production resources due to the rupture of interstate and regional ties, on the other hand the extraordinary rise in prices, which slows down the agricultural sector.

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