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FOREIGN EXPERIENCE IN FLAX PRODUCTION AND ITS IMPORTANCE IN THE NATIONAL ECONOMY

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Abstract

As humanity today approaches consumption more consciously, it is becoming important for many to understand how the things they purchase are made. As a rule, when purchasing, people give preference to several factors: high quality and long service life of an item, an environmentally friendly production process, and the absence of chemicals and special additives. Let us immediately note that flax is the personification of all the above conditions. The article reveals the factors that determine the positions and motivation of farmers for growing crops, the main of which are high economic effect, the versatility of using processed products in many industries, a source of biologically active substances necessary for functional nutrition and maintaining human health, feeding farm animals and poultry. and etc.

Keywords: *flax, ecology, chemistry, production, industry, oil flax, seeds, oil, manufacturers, production market, export, import, planting area, yield, gross harvest, selling price.*

Introduction. For about 10,000 years, humans have grown flax and used it for a huge variety of things: not just bedding and clothing, as you might think, but also paints, cosmetics, food packaging, and even wound care. This magical plant is an agricultural staple in Western Europe, where the cool climate and moist soil provide ideal growing conditions.

Currently, increasing attention is being paid to reducing anthropogenic impact and respecting the environment. Products consumed by humans should have the least possible impact on the environment at all stages of their life cycle: during their production, transportation, use and disposal.

From this point of view, linen has a significant advantage over other common types of fabrics. Cotton and synthetic fabrics, such as polyester, have gained great popularity in recent decades due to their low cost and fairly good consumer qualities. On the other hand, from an environmental point of view, the use of cotton and synthetics is far from the most optimal choice.

Cotton grows best in hot climates, so it is grown in southern regions such as India, southern China and the United States, Africa and Australia, and Central Asia. However, cotton is also a relatively moisture-loving crop that requires irrigation. As a result of the intensive development of cotton growing in arid regions, water resources in many places are close to depletion, which has already led to catastrophic consequences. The most famous example is the destruction of the Aral Sea due to excessive water withdrawal from the rivers feeding it, which was carried out largely for the needs of the USSR cotton industry. Now in place of the sea there is a lifeless desert.

Flax requires about the same amount of water as cotton to grow, but flax grows in temperate climates, so it does not require artificial irrigation. In traditional flax growing areas, precipitation is higher and evaporation from the soil surface is lower compared to many new cotton growing areas.

Flax (lat. Línum) is a genus of herbaceous plants of the Flax family (Linaceae). There are about 200 species [6]. Common flax is a valuable spinning and oilseed crop. Perennial, less often juvenile and annual herbs or subshrubs. Leaves are sessile, alternate, less often opposite or whorled below; in shape: linear, lanceolate, linear-lanceolate, obovate, oblong, narrowly elliptical or spatulate, entire-edged or finely serrated, glabrous or pubescent, with 1 or 3-5 parallel, to varying degrees, pronounced veins; sometimes with 2 brownish stipulares glands at the base of leaves.

Species of the genus are native to temperate and subtropical regions of both hemispheres. They are found in different ecological conditions, but most often on dry rocky, clayey, limestone and grassy slopes, in lowland and mountain steppes, in subalpine and alpine meadows, and sometimes in salt marshes.

Flax has been cultivated since time immemorial, but it is difficult to decide clearly where its original homeland is. Regarding annual flax, it is most likely that it originates from the Eastern Mediterranean (Transcaucasia, Anatolia, Western Persia). It easily grows wild, becomes difficult to cultivate and is considered by authors in many countries to be wild or feral, sometimes even a weed. There is a lot of wild flax in southern Russia.

The genus of flax includes more than a hundred species, of which the most important is common flax, or spinning flax (Linum usitatissimum L.) - annual bare or almost bare (without hairs) grass; the stem is from 30 to 60 cm high, and in warm countries, for example in India , even higher; branches only in the upper part, in the inflorescence; leaves are alternate, narrowly lanceolate; the flowers are collected at the top in the form of a false umbrella; sepals pointed, finely ciliated; the petals are blue with a grayish tint, sometimes white, broad-bladed, the anthers are blue, the fruit (flax head in common parlance) is almost spherical, the seeds are glossy [8].

Flax has long been used as a spinning and oilseed crop. The flax is not mowed, but pulled out by the roots - tugged at. Previously, this work was done manually, but now there are special machines for this. Flax stems are tied into sheaves, dried and threshed to separate the seeds. At the creamery, oil is squeezed out of them, which is suitable for food, but most often it is used for making drying oil (a base for varnishes and paints), as well as for making soap . Flaxseeds are also used as medicine.

Linen yarn consists of fairly strong, perfectly round bast fibers . fibers , strongly pointed at the ends, reaching a length of 4 cm or more. Mainly two subspecies of ordinary flax are bred, namely: long flax with a few branched inflorescences and a taller stem, mainly for yarn, and curly

flax - more squat and with a very branched inflorescence similar to curls, which is where the name comes from. Curly is bred mainly for seed production.

Flax seeds immersed in water are soon covered with colorless mucus, which comes from the spreading of skin cells consisting of bassorina. In the cells of the embryo and the thin layer of nutritious tissue surrounding it, there is predominantly fatty flaxseed oil containing butyric linolenic acid. The medical and technical significance of flaxseed is precisely based on the content of these substances.

Depending on the type of flax, cultivation technology (to a greater extent) and the quality of its subsequent processing in production (to a lesser extent), flax yarn is divided into yarn made from long fiber and short fiber (noil).

Long-fiber flax is used to manufacture products that meet the highest quality requirements, namely: wear resistance, weather resistance, durability, and, importantly, environmental friendliness and naturalness.

Short-fiber flax has significantly lower wear resistance, weather resistance, durability and is used in all other cases when the above-described requirements for the quality of linen products are not important or are unattainable based on the level of technology and agricultural technology. Products made from short-fiber flax are usually finished with special fire-resistant, hydrophobic and other chemical impregnations, which artificially increase their consumer characteristics. Often, products made from short-staple flax are mistakenly called products from long-staple flax, taking the length of the final thread, rather than the length of the original fiber, as the basis for the name. For example, "plumbing flax" is actually made from a short fiber (short-staple flax) but a "long" thread.

Transport is a significant source of greenhouse gases. As already mentioned, cotton is grown mainly in the tropical and subtropical zones, and the delivery distance of raw materials and finished fabrics to Northern and Central Europe, even from relatively close Central Asia, is about 3000 km. What can we say about India and China. Spinning flax is grown both in the European Union itself and near its borders - in Russia and Belarus.

Linen fabrics are more durable and less susceptible to wear and tear than cotton and polyester. Accordingly, linen products are less likely to need to be replaced due to their natural wear and tear or accidental damage.

Flax is one of the oldest cultivated plants, but where its native representative is is unknown. The culture of flax can be traced back to ancient times. The ancient Egyptians knew flax as the most common plant. How high their technical processing of flax was, this is proven by the linen fabrics of that time, so thin that it was difficult to count the number of threads in them. The Jews, after their stay in Egypt, brought flax to Palestine. According to Herodotus, flax culture also flourished in ancient Colchis, along the eastern coast of the Black Sea. The fabrics produced here were not inferior to Egyptian ones. Linen fabrics have been found between the remains of pile buildings in Swiss lakes . Judging by the written evidence of classical writers, neither in Greece nor in Rome did linen occupy such a prominent place as in some Asian countries. It is believed that flax in one form or another was introduced into Greece from Colchis or Egypt. In any case, linen fabrics were well known to the Greeks. Of the Roman agronomist-writers, some do not talk about flax at all (Cato), others mention only in passing (Varro, Columella). According to Pliny, the flax culture could not find favorable soil in the mountainous areas of the classical peninsulas, but in wooded countries it was quickly adopted by the population during their colonization. However, in Italy, areas cut by rivers and canals, as well as the coast of the Adriatic Sea, were famous for their flax crop. Pliny was also known as a master in the manufacture of linen fabrics by the Celts who lived in what is now the Netherlands. From there, it was not difficult for flax culture to spread throughout Europe.

The name flax obviously comes from the Greek Λίνον and Latin linum, which were retained by all peoples inhabiting Europe. It is known about the Western Slavs that they paid their rent in flax and yarn.

In Russia, flax has always been the most beloved plant and has been bred since time immemorial, which is confirmed by both chronicles and legislative monuments. In Old Russian In agriculture, flax was not only a spinning plant, but also an oil-bearing plant.

Linen fabric has a wide range of uses in the clothing industry. Modern technologies have made it possible to use flax everywhere and use waste, minimizing the appearance of residues.

Flax production occurs in 4 stages;

First stage. Planting, growing and harvesting. Because flax does not tolerate heat well, it needs to be planted during cooler times of the year. Flax plants are ready for harvest after about 100 days of growth. As soon as the stems turn yellow and the seeds turn brown, the crop is ready to harvest.

Second phase. Fiber separation. After the flax stems are harvested, they are processed by a machine that removes leaves and seeds. The fibrous outer stem is then separated from the soft, woody interior. This process is called "retting" and unless done professionally, the fine flax fibers used for textile production can be damaged. After “soaking,” the stems are passed between two metal rollers, which separates the unusable outer fibers from the inner ones. Once the inner fibers are separated, they can be combed into long, thin strands.

Third stage. Spinning. This process used to be done using a pedal-powered wheel, but these days flax producers use industrial machines. Short flax fibers are connected to each other using special devices. The resulting yarn is wound onto a bobbin. To ensure that the flax yarn does not fall apart, the winding process must be done under humid conditions.

Fourth stage. Linen textiles. The resulting yarn is used to create linen fabric, and from it high-quality natural textiles. Linen bed linen, curtains, tablecloths and towels, clothing, interior accessories, etc. – all these products are created by brands that value high quality and natural material, which, despite all its wonderful properties, does not harm the environment.

Since flax really only needs the right climate and area to grow, it is a very environmentally friendly plant. Farmers use no pesticides and use far less water to grow, which means less soil pollution and less damage to insect life and wider ecosystems.

About 80% of flax is grown in fields of rich, wet land, covering an area of about 120,000 hectares from northern France through Belgium to the Netherlands. Although it is a key industry in Europe, worldwide flax accounts for only 1% of fiber production! Given the need for sustainable fabrics, many people support the idea of encouraging more space to grow and process flax.

In European and Asian markets in recent years, the

cost of commercial crop products varies between 400-430 US$/t, and the increase in prices for flaxseeds in Canada in 2021/2022 MY due to stable global demand was predicted to reach 800 US$/t. The main Importers of flaxseeds and processed products are EU countries and China. There was a significant increase in prices for commercial products, especially linseed oil.

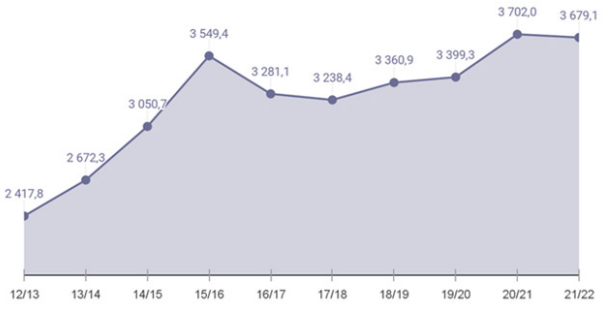

Figure 1. flax seed production in the world from 2012/2013 to 2021/2022, thousand tons

Over the past ten seasons, global flax seed production has increased by 52% and reached 3.7 million tons in 20/21 and 21/22 MY (according to UN FAO).

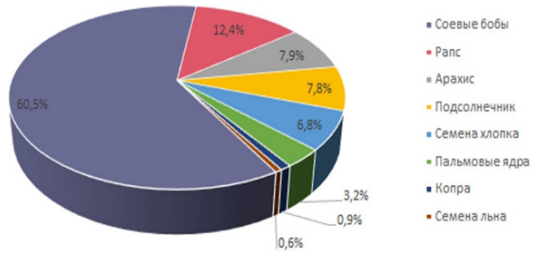

Figure 2. Structure of world production of oilseed crops

Despite the active growth of this segment, the share of flax seeds in the structure of world production of oilseeds is less than one percent.

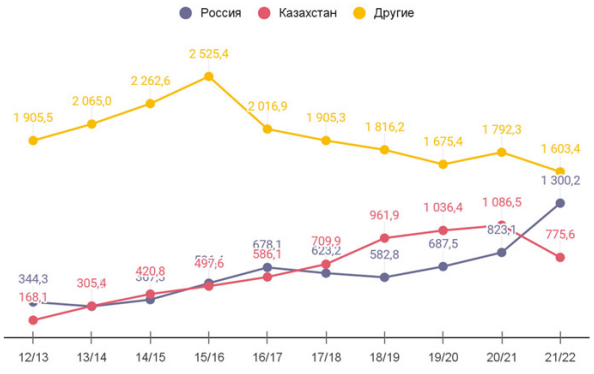

Figure 3. Gross harvest of this oilseed crop

Although more than forty countries are engaged in flax cultivation, only two producers make a difference in this market. Against the backdrop of a fall in the gross harvest of this oilseed crop in other countries, the Russian Federation and Kazakhstan were actively growing. At the same time, our country was a leader for several years in a row and only lost first place last season.

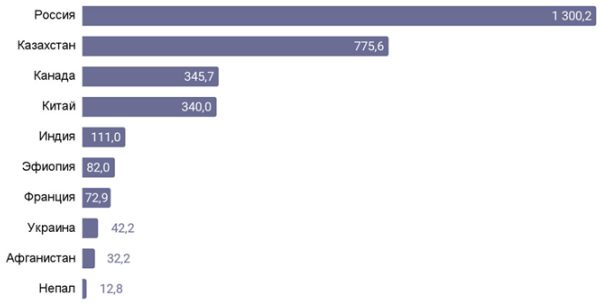

Figure 4. Top ten largest oilseed crop producing countries

In the top ten largest producing countries, Russia and Kazakhstan lead by a significant margin. And this is not surprising, because they account for 56% of gross receipts worldwide.

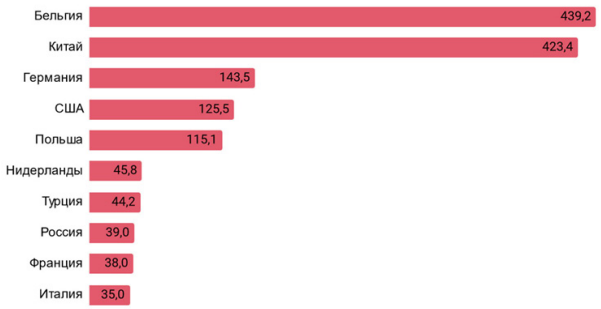

Figure 4. Top ten largest largest importers of flax seeds

Two countries are also leaders among the largest importers of flax seeds. Belgium and China accounted for 53% of total imports last season

Conclusion. In recent years, the gross harvest of oil flax seeds in the world has increased significantly. According to international sources, back in 2016 it reached 2.65 million tons, and by 2020 it increased to 3.29 million tons. However, despite a significant expansion of sown areas and high prices on the world market, oil flax seed production in 2021 year again decreased to 3 million tons. The reason for this drop is unfavorable weather conditions in key producing countries (Russia, Kazakhstan), as well as in Canada, where the yield of flax seeds fell sharply, which led to a reduction in its production. However, the global flaxseed processing rate in 2021 was slightly less than the previous figure (2.49 million tons). This situation is associated with an increase in the collection of flax seeds in the Russian Federation in the 2021 season to a record 850 thousand tons. According to Oil World analysts, global exports of oil flax seeds also decreased (by 14%). In the period of the 2021/2022 marginal year (hereinafter referred to as MY), the supply of seeds from the main exporting countries was estimated at 465 thousand tons against 538 thousand tons in August–November 2020. At the same time, Russia exported the main volumes of seeds in the current season (+ eleven %). Kazakhstan and Canada reduced supplies by 37% and 39%, respectively. The countries of the European Union (236 thousand tons), China (121 thousand tons) and the USA (41 thousand tons) imported the most crop seeds. In addition, in August–November 2021, Turkish traders increased imports of oil flax by 17 times (from 2 thousand tons to 34 thousand tons). The main producers of flax oilseeds in the world until 2017 were Canada and Russia (21% share in global production), then Kazakhstan (20%) with an annual harvest of 300–400 thousand tons, China

(14%), USA (8%). Until 2017 inclusive, the gross harvest of flax seeds in Ukraine also grew (the share in world production is 3%), but for the entry of Ukrainian flax seeds and their processed products into the world market, Russia and Kazakhstan represent serious competition in terms of price and quality.

Linen is the only fiber that has antibacterial properties. Flax seeds contain up to 42% fat and up to 23% protein. It has been established that flaxseed oil has medicinal properties that can significantly reduce the risk of acquiring cancer, diseases of the cardiovascular system and gastrointestinal tract. The addition of flaxseed and oil when preparing baked goods has a preventive effect on the human body. The production and consumption of specially prepared edible oil is expanding and, for example, more than a million hectares of oilseed flax are already sown in Canada.

The introduction of new technologies for processing fiber flax into production will make it possible to solve a number of important social and technical and economic problems: to provide the population with comfortable and highly hygienic materials, to use idle production equipment at flax enterprises, to create additional jobs, to obtain savings in foreign currency through import substitution, to increase .

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