

DEVELOPMENT OF LATVIAN PEAT INDUSTRY OVER LAST 100 YEARS

Latvijas kūdras industrijas attīstība Latvijā pēdējo 100 gadu laikā

Ingrīda Kriģere

University of Latvia, Faculty of Geography and Earth Sciences

e-mail: ingrida.krigere@gmail.com

Abstract. Various economic, political and social developments influenced the development of the peat extraction industry in Latvia during the 20th century. In comparison with some other European countries, where peat had been used for the needs of the energy sector for several centuries, the development of peat industry in Latvia was somewhat different. The aim of this study was to find out the nature of the development of the peat industry based on an analysis of historical information and a comparison of advantages over other European countries. In order to understand the changes and factors influencing the development of the peat industry in Latvia, it was necessary to identify and evaluate peat extraction volumes, changes in peat use purposes and technologies, as well as factors influencing the industry's development. A comparison of historical data on peat industry development in Latvia and in other European countries reveals a number of differences. Latvia was the first country in Europe to restructure peat extraction from using peat for energy to extracting and processing it for horticultural needs. Large amounts of peat were used for combustion in Latvia only for a relatively short time: between 1960 and 1990. Peat extraction decreased significantly in 1992 – a time when export markets were beginning to develop. Since 2003, more than 90% of extracted peat has been exported, mainly for the horticultural peat market.

Keywords: *peat, growing media, horticulture, energy, export*

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Introduction

Latvia is rich in peat resources, reaching 1.5 billion tonnes in the peatlands, and there are significant mineral deposits in the country. Peat is widely used as a fuel and for agricultural purposes and was an essential part of the national economics during the 20th century (Šnore 2013). So far only 4% of all peatland areas in Latvia have been used for peat extraction, but the purposes of peat use changed significantly in the period between 1920 and 2020 as a result of social, economic and political processes (LKA 2019).

Peat use dates back at least to Roman times, when it was mentioned as being used as a fuel in homes. Peat became an energy source in Europe during the 12th century, especially in countries where trees were scarce, like Ireland and Scotland. In the 19th century, Germany developed technology for harvesting and pressing fuel peat into small bricks, which is used in many countries up to the present day. In Finland and Ireland, it is still used on an industrial scale to generate electricity today.

Therefore, there is an impression that peat is mainly a component of energy production systems, and that it should be treated as a fuel. Many policy documents both in Latvia and in Europe are based on this assumption, but it has not been taken

into account that peat today is an irreplaceable substrate for growing vegetables and ornamental plants, as well as landscaping and forestry, and is in demand globally. Two different objectives for peat extraction should be clearly defined: peat as an energy source and peat as an essential basis for successful horticultural development. Both of these require conditions and regulations of their own. Development of such regulations and documents for the peat industry is especially important for Latvia, as 95% of harvested peat is provided for horticultural needs.

Peat extraction in Latvia is considered to have begun at the end of the 17th century and the beginning of the 18th century, when Duke Jacob ordered for peat to be used as a fuel in addition to firewood in order to save trees. However, industrial-scale peat extraction started at the beginning of the 20th century for the needs of heating and bedding (Nomals 1930; Lācis 2010). The largest volumes of extracted peat were harvested in 1960-1990, reaching seven mln. tons and, besides other ways of utilisation like bedding and soil improvement, peat was also used as an energy source, especially for the operation of the peat-fired thermoelectric power plant TEC-1 in Rīga, built in 1958, which was to be heated with peat (Snore 2013; Ozola 2016).

In 1991, when the socio-economic system in Latvia completely changed, state farms and collective farms were abolished, which drastically affected the peat extraction industry. The lack of demand for peat as well as the outdated machinery led to a dramatic decline in peat extraction. The former state-owned enterprises were privatised and means were sought to update the technology for peat extraction and processing, to seek new markets and to attract foreign investors. Taking into account the requirements and needs of the European peat market, the industry began to switch to peat extraction for horticultural purposes in the second half of the 1990s. In 1993, volumes of extracted peat started to increase, and export of peat developed, exceeding domestic consumption by 2003.

Currently, the peat extraction sector is most affected by climate issues, the transition to a "green economy" and the introduction of climate change mitigation measures. At the moment, the EU's Paris Climate Agreement sets a target of at least a 40% reduction from 1990 levels of greenhouse gas (GHG) by 2030. Currently within the framework of European Green Deal, emissions are set to be reduced by 50% by 2030, and to become completely climate-neutral in 2050.

The peat extraction industry is emission-intensive, and particular attention is paid to the extraction of energy peat. There is a global tendency to discontinue the extraction of peat for the needs of the energy sector and to extract peat only for horticultural purposes and for the production of high value-added products. A lot of countries that have so far mainly extracted peat for energy purposes have to reorganise and restructure their production.

This study aims to find out how the Latvian peat industry has developed over the last 100 years during changes in social and political conditions.

The study was carried out by collecting and analysing historical data, focusing on various purposes for peat use, determining factors in the peat industry and comparison with data from other countries.

Data and methods

The information was collected and compiled using various literature sources, both published and unpublished. The study uses data published in the 1962 and 1980 issues of Latvijas PSR Kūdras fonds; СВИКЛИС (1970); Grosvalds (1970); Brakšs (1961); Ямпольский (1979); Eiduks, Kalniņš (1961); Clarke, Josten (2002); Karnups (2016); Lappalainen ed. (1996); and Korhonen R., Korpela L., Sarkkola (eds.) (2008).

Quantitative and qualitative data collected by the Central Statistical Bureau on Latvian exports and imports (in the 4-digit code of the Harmonized Commodity Description and Coding System) for the period from 2000 to 2018 were used. Information was collected from documents of various ages in different archives. The following information sources were also used: information from the State Geological Fund maintained by the Latvian Environment, Geology and Meteorology Centre; historical materials from Meliorprojekts; the project "Innovation in Peat Research and Development of New Products Containing It"; and the project "Preparation of Recommendations on Latvian Peat Deposit Data Quality for their Improvement and Use in the Preparation of the Basic Documents of the National Strategy"; as well as data from the Latvian Peat Association and data from the International Peatland Society (IPS).

Trends in changes in peat extraction for various needs related to political and economic developments in the country were analysed and evaluated using visual materials derived from the collected and analysed data.

Discussion

In total, 9.9% of the territory of Latvia is covered by peatlands, where 11.3 billion m³ or 1.7 billion tonnes of peat have accumulated (LEGMC 2020; Peat Fund 1980). By comparison, peatlands cover about 20% of the total area of Estonia, and the total in Lithuania is 5%. (Lappalainen 1996.)

A study was carried out which found that in the Baltic region, the average accumulation rate over the last 200 years has been about 2mm per year (Stivrins et al. 2017). This allows us to calculate that in the peatlands of Latvia, approximately 1.6 million tonnes of peat accumulates annually, while an average of 0.81 million tonnes of peat was extracted per year (1991-2019), which means that peat resources in the country have increased on average by 0.79 million tonnes per year and by approximately 22.91 million tonnes since 1991.

Our country is rich in peat, and it is an essential resource for its economy, and over time it has been used for various purposes. The origins of peat use in Latvia can be traced back to the 16th century; written evidence reveals its development and use at

that time in heating, bedding, dry toilets, product storage, insulation materials and agriculture (Šnore 2013; Ozola 2016).

Now peat is also used in medicine, beauty care, the textile industry, paper production, for filtration material and biosorbent, feed additive production, construction, art, etc.

As peat litter started to be produced on a larger scale in Western Europe in the 1880s and 1890s, this issue also became relevant in Latvia. As a result, in 1912, the establishment of litter peat and litter production companies began, and the cutting of peat for litter production developed (Druvietis 1957) Later, with the establishment of independent Latvia, the Peat Utilisation Board was established, which began to produce peat for energy purposes on a large scale (Figure 1). Unfortunately, demand for fuel peat fell sharply after a couple of years due to the low price of firewood (Grinduls 1933).

The extraction of larger volumes of peat began after 1924 when the first dredging machine in Latvia was received from the United States, and significant river regulation and excavation of main ditches began in all major river basins (Nomals 1936).

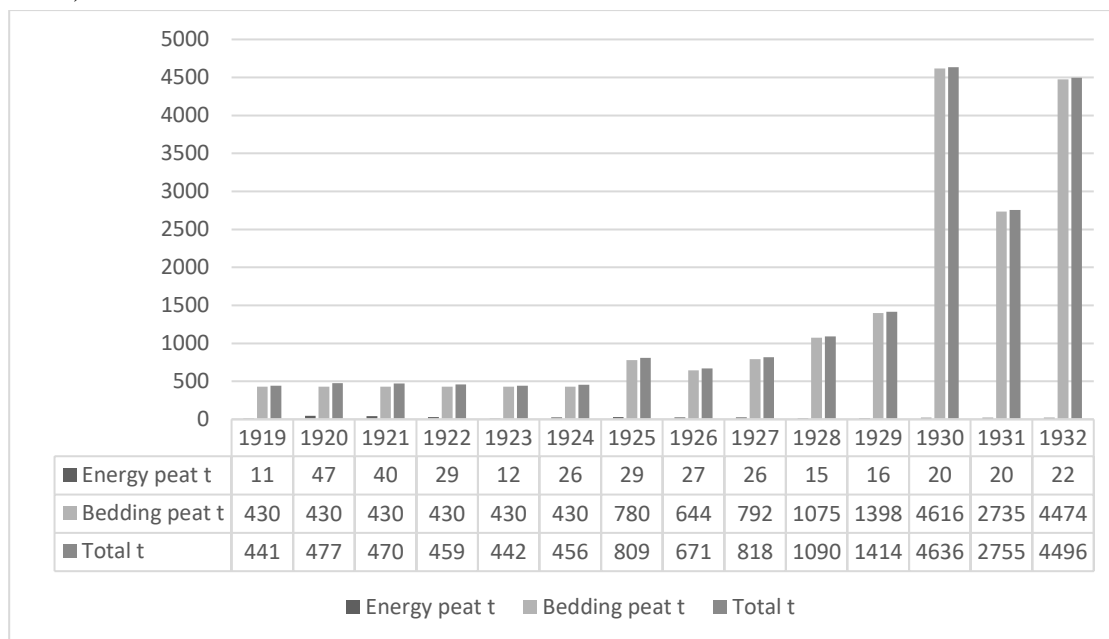


Figure 1. Peat extraction and use in Latvia in the years 1919–1932, tonnes (author’s figure)

At that time, the state was practically the only owner of Latvian mires. It leased mires to companies and private individuals on preferential long-term or annual leases. As of 1st January 1936, 37 mires had been leased for the harvesting of fuel peat, and 66 long-term lease agreements had been concluded. In 1935, 33,000 m³ of cut peat was produced for incineration. At the same time, 233 state mires with an area of 2,196 ha were leased for the production of bedding peat. In 1935, 50,100 m³ of bedding peat was produced in mires leased from the state. There were three modern bedding peat factories: in Ploči Mire near Liepāja; in Salaspils Mire near Rīga; in Pētermuiža Mire

near Līvāni. Fuel peat was also produced in all these plants. In 1936, a factory producing peat insulation boards started operating in Ploči Mire (Nomals, 1936). In the years up to 1940, the most common use for peat was bedding, with fuel peat in second place (Greste 1948).

Table 1. **Volumes of air-dry fuel peat and bedding peat produced in Latvia from 1937 to 1940, m³**

Type of peat use	1937	1938	1939	1940
Fuel, m ³	74,000	116,000	173,000	250,000
Bedding, m ³	234,000	252,000	432,000	665,000
Total, m ³	308,000	368,000	605,000	915,000

Peat extraction volumes grew in particular in the period from 1960 to 1990, when demand for energy peat and agricultural peat increased significantly (Figure 2).

In 1958, TEC-1 was built in Rīga, which needed peat to ensure the operation of the plant. For this reason energy peat extraction developed rapidly, and several peat factories were constructed for this purpose (in Seda, Stružāni and Zilaiskalns). The second-largest consumer of milled peat was the Sloka pulp and paper mill (Šnore 2013). In the early 1960s, the extraction of agricultural peat for bedding and fertiliser also increased. By the 1970s, peat extraction was well-developed, taking place in more than 100 deposits. Around 4.3 mln. tonnes of peat was extracted annually, and used for bedding, compost and as fuel.

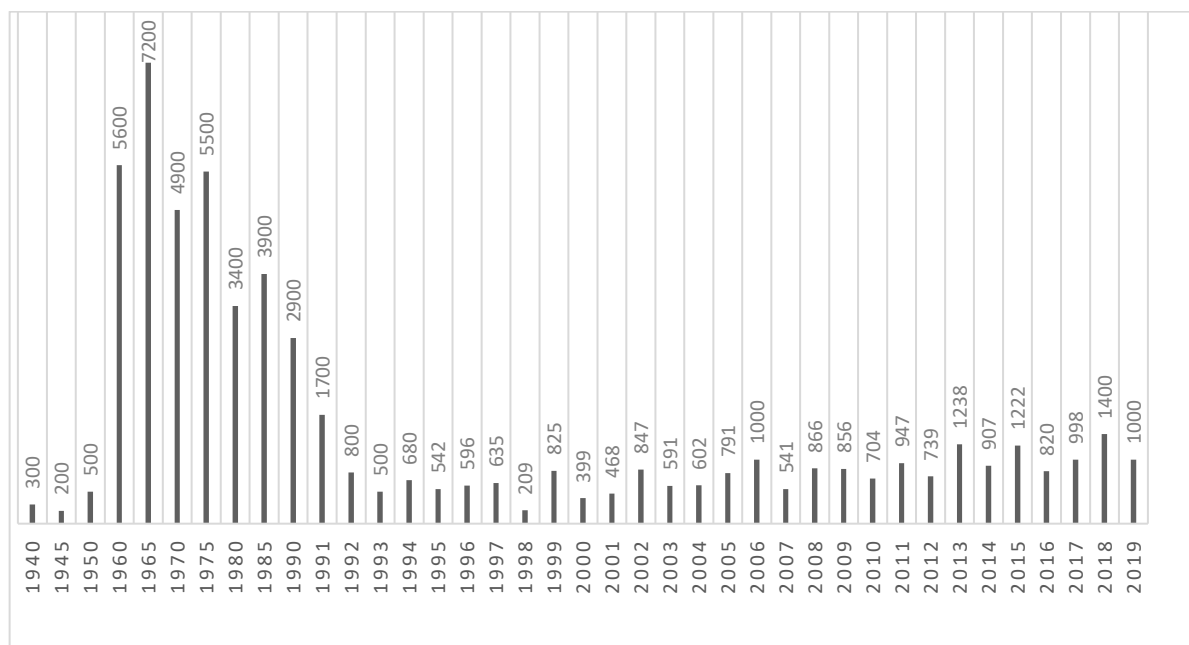


Figure 2. **Amounts of peat extracted in Latvia from 1940 to 2019, thousand tonnes per year** (author's figure)

The Latvian peat extraction industry experienced a sharp decline in 1991, when the largest peat consumers, state farms and collective farms were gradually eliminated.

The state structure changed, and peat companies were privatised. In the late 1990s, the industry began to restructure and switch to peat extraction for horticultural purposes. The peat extraction business is investment-intensive and profits in this sector are not quick to make. During this time, many foreign investors came to Latvia; they had experience in trading horticultural peat and had outlets to sell it at, as well as the opportunity to invest, and to start extracting and processing agricultural peat.

In 1993, peat extraction started to increase again. In the last 20 years the industry has stabilised and now ups and downs in peat extraction depend mainly on weather conditions and the amount of precipitation in the peat extraction season.

The use of peat for energy experienced a dramatic decline in 2003, due to TEC-1 having been rebuilt and no longer using peat to ensure its operation. Since 1998, peat extracted in Latvian has almost exclusively been used for agricultural (mostly horticultural) purposes. (Figure 3).

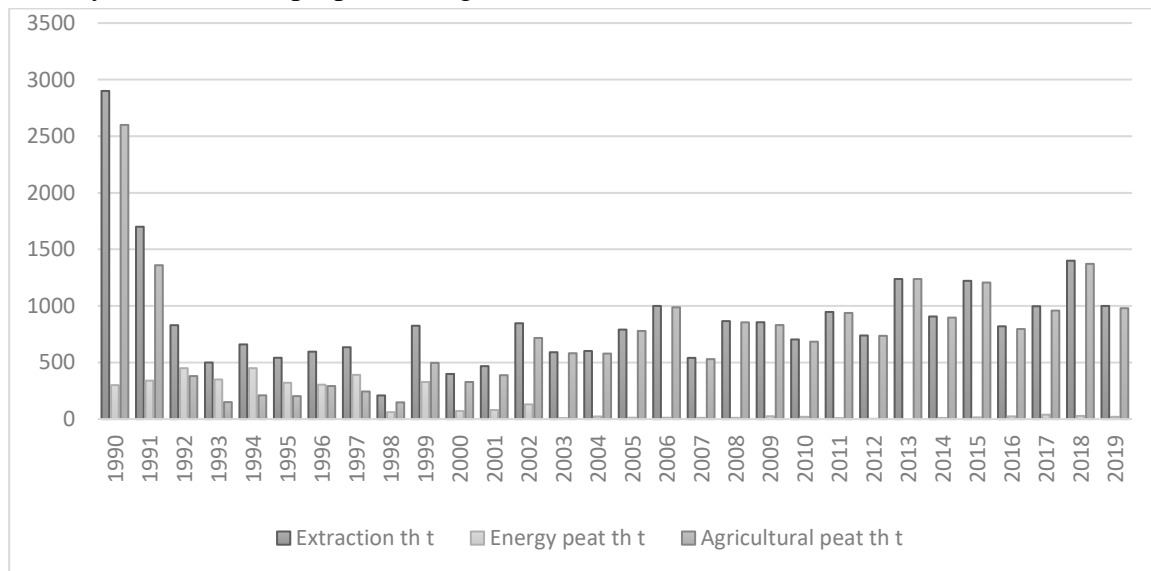


Figure 3. **Volumes of peat extraction and types of use from 1990 to 2019 (thousand tonnes)** (author’s figure)

Along with the reorientation of the industry, the market for peat consumption also changed. While until 1991 extracted peat was used in the local market, after 1993 the export market started to develop, and starting from 2000 more than 90% of the peat resources extracted in Latvia were exported (Figure 4).

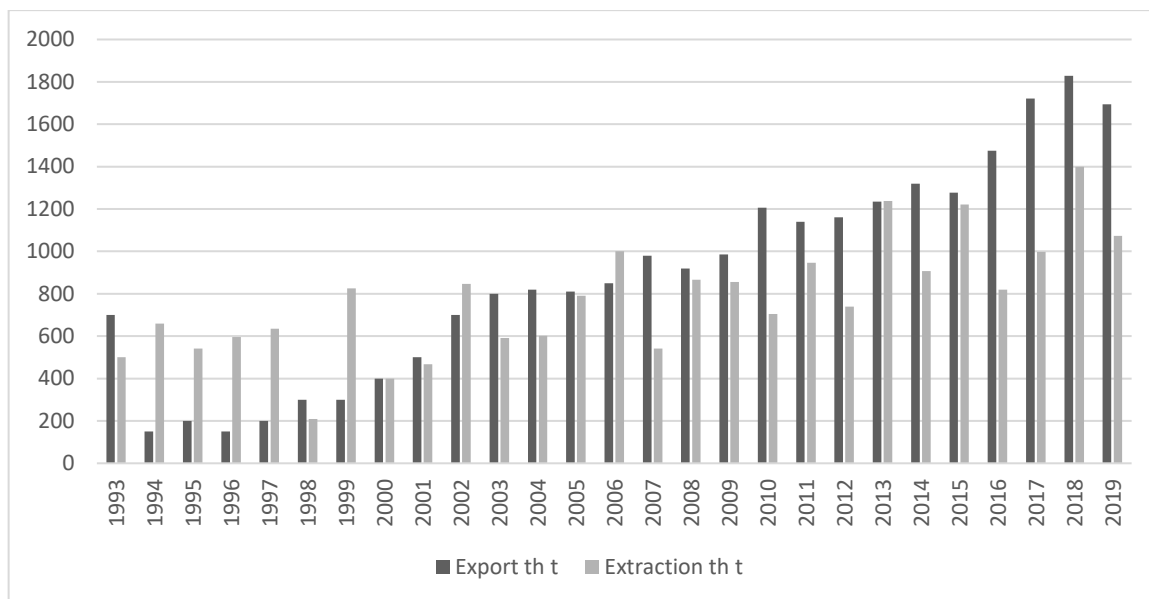


Figure 4. Peat extraction volume and export of peat products 1993-2018, thousand tonnes (author’s figure)

Starting from 2003, export volumes started to exceed extraction volumes, indicating an increase in the production of growing media. Statistics on exports comprise all peat products, including pure raw materials and various peat products.

Latvia, in contrast with other peat-extracting countries such as Estonia, Finland, Sweden and Ireland, was the first to restructure its peat extraction industry from energy peat extraction to horticultural peat extraction. In the aforementioned countries, the majority of peat is still extracted for energy purposes (Table 2).

Table 2. Peat extraction volumes and purposes in 2017 in various EU countries (IPS)

Country	Peat extraction, thous. m ³	Horticultural peat, thous. m ³	Energy peat, thous. m ³
Ireland	17,100	4,100	13,000
Sweden	3,100	1,700	1,400
Finland	11,097	1,000	9,500
Estonia	3,784	2,648	1,135
Latvia	4,988	4,900	88
Lithuania	2,500	1,788	712

According to data from the IPS, in 2017, 55% of peat extracted in the European Union was used for energy production, 37% for horticulture and 8% for other purposes (Figure 5).



Figure 5. Use of peat extracted in the EU (A) and in Latvia (B) in 2017 (author's figure)

In Latvia in 2017, 95% of peat obtained was used for horticulture purposes, 4% for energy production and 1% for other needs. The situation is changing rapidly, and it is expected that, when the statistical data have been collected, more than half of peat extracted in the EU in 2019 will have been used for horticulture.

The historical situation is favourable for Latvia's peat extraction sector, as the prevailing global trend in reducing GHG emissions directly affects the use of peat for energy purposes. According to the energy regulations of the European Union, peat is considered a fossil resource. Consequently, in order to move towards climate neutrality and mitigate climate change, countries stipulate that the extraction and use of peat for energy must be reduced and gradually stopped. This has a major impact on peat-producing countries, where the main use of peat is for energy.

Latvia is the most favourably placed peat-producing country, due to the reorientation of its industry at the very beginning of this century. Now we only extract horticultural peat, which is used for growing food, ornamental plants etc. GHG emissions also result from this kind of peat use; however, the cultivation of plants in peat substrates (peat-growing media) later results in the capture of GHG emissions. For example, 6,000 tree seedlings can be grown in 1 m³ of peat; three hectares of forest can be planted using this, and in turn will capture 1110 t of CO² in 50 years.

After their use in plant cultivation, peat substrates can be used to improve the soil, thus creating better conditions for plant growth and absorbing more GHG emissions.

The large amount of energy peat, which has so far dominated in peat-extracting countries, may also be the reason for shortcomings in statistical accounting, which have had and might continue to have consequences for European Union member states, as well as for the regulations of the EU and international regulations. In particular, this affects or may affect climate policy documents where peat currently is considered primarily as an energy resource.

In the statistics on external trade in goods, within the meaning of the Combined Nomenclature (hereinafter – CN), peat is considered to be an energy product ("Chapter

27. Mineral Fuels, Mineral Oils and Products of Their Distillation; Bituminous Substances; Mineral Waxes", code 2703). In the description of the CN, peat is mentioned alongside coal products. There is no other place for peat and peat products (substrates) in this nomenclature, so for companies exporting peat and peat substrates, this is the only way to report these exports.

Currently, Latvian, EU and international statistics are misleading about the use of peat. Consequently, the goal of introducing the CN – to provide internationally comparable statistics on foreign trade – is not being fulfilled.

Conclusions

Political, economic and ideological factors have affected the development of the peat extraction industry in Latvia. Extraction objectives in Latvia have changed several times, and unlike in other European countries, the use of peat for energy played a key role in Latvia only for 30 years.

The peat industry has been influenced by various kinds of peat use: the development of bedding peat, its use as fuel for home heating, its use as fuel for TEC-1 operation system and its use in horticulture.

Determining factors in the peat industry:

- Political factors – establishment of the peat industry before the First World War, Latvia's first period of independence, the period of Soviet occupation, Latvia's second period of independence (starting in 1991), foreign investors.
- Social factors – the development of workers' skills, the development of technique, the development of the EU.

For the last 18 years, peat has been extracted in Latvia primarily for horticultural needs (95%), not for energy production, as in other countries. Thus the Latvian peat extraction industry has already been restructured and can meet climate requirements significantly better than other countries

The high consumption of peat for energy in the European Union has determined the political attitude towards peat resources. In the energy sector, it is classified in the category of fossil resources, although this is a slowly renewable resource. According to the external trade statistics of the Combined Nomenclature, peat is also considered to be an energy product. There should be different approaches and regulatory frameworks for horticultural and for energy peat.

The structure of the peat market has changed over time. Until the end of the 20th century, peat was used for domestic consumption in Latvia, but since the beginning of the 21st century it has generally been exported. Currently, 93% of peat extracted in Latvia is exported. Peat products are an important part of Latvia's exports and make up 1.44% of the country's total export volume (in 2018) (CSB 2020).

Currently, climate and nature conservation aspects are the main factors influencing peat extraction. GHG emissions from extraction processes and extraction areas will be significant, as starting from 2025 countries will be required to report

emissions from economically used wetlands. Consequently, peat extraction cannot increase substantially, and the industry needs to think about emission reduction and compensation. In order to maintain the sustainability of peat extraction, compensatory measures in the field of GHG emissions must be developed for the industry. Scientific research is needed to create peat products with higher added value, thus making a greater contribution to the national economy per tonnes of GHG emissions created by peat extraction. In Latvia, only the export of processed peat should be promoted, and favourable conditions for local consumption should be created. At a national level, measurements of GHG emissions and research must be continued, in order to find the most efficient and emission-friendly way of peat resource management.

Reducing GHG emissions by reducing peat extraction is counter-productive given the growing demand for peat substrates, which is growing due to the growing population of the planet and the need for food.

The Peat Guidelines, which are a policy planning document in Latvia, stipulate that peat extraction areas and peat volumes available for extraction must be maintained at the existing amount until 2050. This would ensure the predictability of the peat extraction industry, as well as the desire to invest in the establishment of production facilities, resulting in the creation of added value to peat, and more efficient resource management. At the current extraction volume, peat resources in the country are not decreasing, because the average growth of peat in ten years' time is higher than the extraction volume.

Kopsavilkums

20. gadsimta laikā Latvijas kūdras ieguves nozares attīstību ir ietekmējušas dažādas sociālas un politiskas norises, kā rezultātā tai ir atšķirīgas iezīmes. Citās Eiropas valstīs vairākus gadsimtus kūdras lielā apjomā izmantoja enerģētikas vajadzībām, Latvijā kūdra enerģētikas vajadzībām lielā apjomā izmantota visai neilgu laiku – no 1960. līdz 1990. gadam. Latvija bija pirmā valsts Eiropā, kas kūdras ieguves nozari pārkārtoja no ieguves enerģētikas vajadzībām uz izmantošanu dārzkopībā. Sākot ar 1998. gadu iegūtā kūdra galvenokārt ir izmantota dārzkopībā. 1991. gadā, mainoties sociāli ekonomiskajai iekārtai, tika likvidēti sovhozi un kolhozi, kūdras vairs iepriekšējā apjomā neizmantoja pakaišiem un augsnes ielabošanai. Notika kūdras uzņēmumu privatizācija, tika piesaistīti ārvalstu investori. Ja līdz 1993. gadam kūdras ieguve un izmantoja iekšējam patēriņam Latvijas tirgū, tad kopš 1993. gada ir attīstījies kūdras produktu eksports, kas pārsniedz iekšējo patēriņu. Pēdējos 20 gados nozare ir nostabilizējusies un Latvijā ražoto kūdras produktu apjoms ir 31% no kopējā profesionālajā dārzkopībā izmantojamā kūdras produktu apjoma ES. Pašlaik klimata politika liek samazināt SEG emisijas un, virzoties uz klimata neitralitāti, valstis strauji samazina kūdras ieguvei enerģētikai un pārprofilējas uz dārzkopības tirgu. Latvijā kūdras nozarei vairs nav jāpārkārtojas, tā ieņem stabili vietu pasaules dārzkopības kūdras tirgū.

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