

Special issue: Global fat resources: Connecting themes, approaches and narratives, ca. 1850-2022

With rising resource demands in industrializing societies since the 19th century, global natural resources became an important element of national and international politics. In recent decades, the increasing liberalization of markets and the rapid development of emerging nations such as China and India has increased the global demand of and pressure on as well as dependencies on the import and export of energy resources, metals, agricultural products, and other commodities significantly. The exploitation of global resources created wealth and triggered innovation, but it also led to tremendous social and environmental costs and created competition and vulnerabilities across the globe. Since about the early 1990s, global resources have become a fruitful topic in many historical sub-disciplines. Historians as well as anthropologists and sociologists have been following these developments and analyzed long-term political and economic impacts on various parts of the world.

The proposed special issue will investigate the development and impacts of global fat resources from the mid-nineteenth century until the present. All fat resources derive from productive environments and, hence, represent a fundamental theme in environmental history that deserves more attention. The term global fat comprises all kinds of edible fat and oil resources ranging from oil seeds such as soybeans, palm fruits, coconuts, and others to various types of animal fats ranging from whale oil to lard. Chemical inventions in the course of the Second Industrial Revolution led to a rising demand of fat resources in the Global North, and industries and societies here became dependent on fat resources from the Global South. While colonial ventures, trade imperialism and the accelerating globalization of postcolonial fat trade generated tremendous profits primarily in the Global North, it made tropical countries fatefully dependent on the exploitation of their natural resources and became a driving force of accelerating deforestation and social and environmental disruption and change.

This special issue aims at making the following arguments: First, it investigates the history of a critical resource that has received much less attention than for example metals and energy resources and shows the growing importance of global fat for both producing and consuming nations and for global environmental change (e.g. Prodöhl, Veraart and Kip, Yakob). Second, it tackles the challenge to connect themes and approaches related to global fat resources. For example, it links colonial spaces of resource exploitation and metropolitan spaces of resource consumption and investigates power relations across large distances and the interplay between global and regional developments (e.g. Prodöhl, Tonolo, Veraart and Kip, da Silva). It captures fat resource exploration and innovation and its social and environmental impacts and consequences (e.g. Jun, Kochetkova, da Silva, Yakob, Heymann). Furthermore, it investigates roles of political ideologies, economic pressures, environmental concerns, social conflicts and cultural interests for

competition and shifts of fat resources production and consumption (e.g. Sparenberg, Gora, Tonolo, Kochetkova, da Silva, Heymann).

Third, the contributions put particular emphasis on the analysis of perceptions and narratives of fat resources, which deserve critical analysis. On one side, the cases investigated exhibit constructions and uses of specific narratives. For example, Sparenberg looks at autarky interests and policies in Nazi Germany. Kochetkova, da Silva and Yacob investigate Cold War and postcolonial ideas and ideologies of modernization. Yacob and Heymann analyze understandings of global and regional justice and sustainability. On the other side, constructions of global fat narratives in historical investigation require analysis and reflection in their own right (Prodöhl). Historians, sources and publications from the Global North overwhelmingly predominate over those from the Global South and tend to produce imbalance and bias. Furthermore, disciplines such as economic history, international relations, colonial history and environmental history tend to produce very different narratives e.g. about trade relations, resource security, resource diplomacy, resource exploitation and environmental destruction, which need to be linked and put in perspective.

This special issue will establish the history of global fat resource as an important field of study, deepen the historical understanding of global fat and contribute to the reflection of this field of investigation. It covers a variety of cases dealing with plant and marine fat resources, focusing on different countries and connections linking the Global North with Africa, Asia and South America. Furthermore, it is based on a broad range of scholarship linking disciplines such as environmental history, global history, economic and business history^{1/2}, history of science and technology and cultural history with authors from Europe, Asia and South America. Examining the versatile roles of fat resources in various regions and between them is important to comprehend the globe as (dis-)connected by ideas and actions in exploiting, interacting with, and depending on natural resources. The issue is based on a workshop held in May 2023 at the University of Bergen as part of the research network “Challenging Europe: Technology, Environment and the Quest for Resource Security” (EurReS).

Special Issue Editors

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Elena Kochetkova is historian of the environment, technology, economy and state socialism. Currently, she is an Associate Professor in Modern European Economic History at the Department of Archeology, History, Cultural Studies and Religion at the University of Bergen. She served as a Secretary of the European Society of Environmental History in 2019–2021. Among her publications are articles in leading international journals, such as *Technology and Culture*, *Environment and History*, *Contemporary European History*, *Journal of Contemporary History*, among others. Her first monograph *The Green Power of Socialism: Wood, Forest, and the Making of Soviet Industrially Embedded Ecology* is forthcoming with the MIT Press in 2024.

Matthias Heymann

Matthias Heymann is professor for the history of science and technology at the Centre for Science Studies, Aarhus University, Denmark. He has published on the history of resources, atmospheric and climate research. He led larger international research projects on the history of geophysical research in Greenland and on cultures of prediction in climate science. Currently, he coordinates the Research Group Technology, Environment and Resources and the research network “Challenging Europe: Technology, Environment and the Quest for Resource Security, EURES (both together with Elena Kochetkova). He is Domain Editor of *WIREs Climate Change* for the domain Climate, History, Society, Culture and edited special issues in journals such as *Studies in History and Philosophy of Modern Physics* (2010), *Centaurus* (2013, 2017) and the *European Review of History* (2020).

Ines Prodöhl

Ines Prodöhl is professor of economic history at the University of Bergen, Norway. In recent years, she has specialized on the global history of food and agricultural commodities, including fat. In her monograph *Globalizing the Soybean: Fat, Feed, and sometimes Food, c. 1900-1950* (published with Routledge in 2023), she asks how the soybean conquered the West. She analyzes why and how the crop gained entry into agriculture and industry in regions beyond Asia in the first half of the twentieth century. As for fat more generally, Ines has published an article in *Global Food History* in 2016. Currently, Ines coordinates the Research Group “Transnational History, 1750– present”.

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Ines Prodöhl, Global fat: Exploring narratives for a modern resource

Fat is one of the three macronutrients that the human body needs in large quantities to live, thrive and reproduce. The other two are carbohydrates and proteins, but none of them contains energy in such high concentration as fat. In fact, fat is vital not only for humans but for all living organism. The history of fat is thus closely related to the history of agriculture, and fishing, as well as to questions of transportation, trade, and environmental matters. In addition to food, organic fats have long been used for other products as well. Traditionally, soaps, candles and paints were based on organic raw materials. From the nineteenth century onwards, numerous new industrial products based on fat have been invented, such as linoleum, explosives, or early forms of plastic. Chemical research has made the use of fat quite complex and with it the understanding of this commodity in general and its significance in the global economy in particular. Thus, the history of fat is also one of inventions, knowledge production, and changes in consumption pattern. This article aims at writing a global history of fat as a food item and commodity for further industrial use in the nineteenth and twentieth centuries. It asks how a global history of fat fits into narratives which are common for other commodities, such as those of globalization and de-globalization, imperialism, as well as de-colonization. Instead of singling out one particular fat-resource, the article wishes to find a narrative for fat as a resource of modern times. While mainly focusing on agricultural and economic matters, the article will also address cultures of consumption and questions of taste, when appropriate.

Akamine Jun, An Introduction to Political Economy of Japanese Modern Whaling: Edible Oil Competition and the Rise and Fall of Whale Oil Production

In the early 20th century, the invention of the hydrogenation process allowed whale oil to be converted to solid form, making it an attractive raw material for products such as bar-soap and margarine. Whaling companies began to penetrate the Antarctic Ocean with factory ships in pursuit of a large supply of highly quality oil. Nippon Hogeï, a Japanese whaling company that was part of Nippon Sangyo, better known as Nissan Group, was one such company, sending a whaling fleet to the Antarctic grounds during the 1934/35 season. This was noteworthy for two reasons: it was the first such whaling voyage by a Japanese firm, and the company's intention was to enter the profitable European *whale oil* market. For seven consecutive whaling seasons through 1940/41, Japanese whalers placed little importance on harvesting meat and blubber for human consumption from the Antarctic. A research focus on whale oil allows a reframing of debates around whaling and whale food pathways. This paper addresses two topics in whaling history: 1) the roles played by whale oil in the development of Japanese modern whaling in the early 20th century and 2) competition among various oils used in edible products such as palm oil and coconut oil. Then, the paper calls for integrated edible oil studies.

Ole Sparenberg, Autarkic, but global: Fat supply and whaling in pre-war Nazi Germany

As a densely populated, highly-industrialised country, Germany became dependent on imports of fats and edible oils in the late 19th century. This posed no problems as long as Germany had access to global markets to export manufactured goods and import agricultural goods. Germany imported tropical fats, but also, from the 1920s onwards, whale oil produced by Norwegian and British fleets in the Antarctic, which was used mainly for margarine. Soon after 1933, the National Socialists began reorienting the German economy towards autarky. Since German agriculture could not substitute all imports of fats, a significant gap opened up – the so-called “Fettlücke” –, and consumers faced shortages long before the outbreak of the war. In order to tackle this situation, the state and industry began to build up whaling fleets. The aim was to obtain fat without spending hard currency. Germany's participation in modern whaling started in the season 1936/37, and by 1938/39, seven German whaling fleets operated in the Antarctic catching grounds. Then the outbreak of war put an end to German whaling. Despite all emphasis on autarky, Germany did not free itself from the international entanglement which characterises global fat supply. First, Germany never achieved self-sufficiency in whale oil or fats in general. Second, links to Norway remained strong as Germany continued importing whale oil, purchased used whaling vessels, and hired specialist crews from the Scandinavian country. Third, the Dutch-British Unilever trust, which dominated the German margarine market, owned most of Germany's whaling fleets. Finally, given the undeniable signs of the overexploitation of whale stocks Germany and other whaling nations concluded a treaty in 1937 to regulate the industry. Fat thus remained a globalised commodity even in the 1930s.

Sasha Gora, Cod and its Oil, Cuisine and its Supplements: Fish Fragmentation and Commodity Connections between Norway and Newfoundland

This article zooms in on cod liver oil as an example of a global fat. By reflecting on the fragmentation and commercialization of cod – from food source and medicine to dietary supplement – it contributes to this special issue’s discussion of global resource connections and considers Norway’s history of cod liver oil production and distribution in tandem with cod’s colonial history in Newfoundland. Cod liver oil connects to themes such as resource exploitation and environmental transformations. Furthermore, it provides an example from a settler colonial state that offers a distinct history of imperial trade relations and global commodity circulations. Cod liver oil in its raw form is produced by fermenting fish livers – mainly *gadus morhua*. Along with stockfish from Vestfjord, cod liver oil was an important early commodity for Norway. Its uses over time have been many: to illuminate lamps; to produce paint and soap and as an ingredient in leather tanning; to mix with clay and to paint on wood to protect it against salt; to feed livestock; and as a remedy for aches and pains. In the eighteenth and nineteenth centuries, the medical profession increasingly recommended cod liver oil to treat the likes of scurvy and rickets. The oil’s popularity then boomed in the early twentieth century with the discovery of vitamins. Gifting foods a new use-value, vitamins not only changed the relationship between nutrition and food but also food marketing. This article begins by sketching out how fish, fat, and commercial markets connect the history of cod liver oil in both Norway and Newfoundland. It then zooms in on advertisements to ask: why did cod liver oil, for the most part, fall out of fashion in Newfoundland yet continues to be popular in Norway? Finally, it ends by discussing the shifting borders between food and medicine, chewing and swallowing, and between a cuisine and its supplements.

Julia Lajus and Dimitri Lajus, Fish oil evolution as a resource: from energy-rich product to vitamins and Omega-3 source

We discuss the construction and transformation of fish oil as a resource during the last century up to present days discussions. Both socio-economic conditions and scientific findings shaped the evolution of fish oil. In the 19th - early 20th centuries, fish oil was commonly used for lightening and as an energy-rich nutrient. Later, it became a source of a number of healthy components, such as vitamins, especially vitamin D, and finally, of polyunsaturated fatty acids such as omega-3. However, its goodness eventually was compromised by unexpected risks. As fat is the most energetically rich substance in animal tissues, it is commonly used in nature for storing energy. It is essentially important in high latitudes with their long winters. because of that the fish oil was predominantly extracted from cold water fish such as cod, anchovies, sardines, mackerel, herring in northern hemisphere and from krill in Antarctic. However, fish oil is also a good solvent for dangerous organic pollutants such as PCBs and DDT. They are effectively bioaccumulated in the marine trophic web widely spreading over the world ocean. DDT, for instance, may appear even in seals in and be consumed by indigenous people in the Arctic. Playing with different spatial scales and combination of primary and secondary sources we address the problem. One of the examples is the ban on using fish oil in Soviet pediatric practice because of accumulation of toxic substances that was suddenly recognized in the 1970s after many years of a broad campaign of medical fish

oil consumption in the country . Now, omega-3 mostly obtained from fish oil, is getting more popular again. We discuss the reaction of discovery of Omega-3 on changes of attitudes towards fish oil in consumption, and different projects of use of less known local species like stickleback and other non-commercial fish resources for its extraction.

Giovanni Tonolo, Global entanglements of palm oil and kernel extraction from French West Africa (ca. 1890-1960)

Among palm oil producers, the French colonies of West Africa have received less historiographical attention. This article aims not only to recover this history, but also to show its connections with the global history of fat resources production. The first section recalls how the French colonial conquest of the region was linked to the evolving uses of palm products in Europe, as well as to the changes in the global market of fat resources following the construction of the Suez Canal. Even after colonization, the trade and extraction of French African palm products was not an exclusively French affair. Most of the palm products were exported to Hamburg and Liverpool, and the first attempts to mechanize the extraction were made not only by French, but also by British and German trading companies. The second section examines how competition from Southeast Asia in palm oil production affected the modernization of the sector in French West Africa. Both the Marseille business sector and the French colonial agricultural service sent missions to Asia to learn from what was being done there. While the former wanted the exact replication of the “Asian model” in Africa (standardized plantations and huge oil mills), the agronomists were more cautious. This conflict was resolved in the 1940s when French businessmen who had been successful in Asia were asked to prepare the development program for West African oilseeds after the Second World War. The third section, on the postwar period, argues that despite the declining importance of French West Africa in the palm oil market, global linkages diminished but did not disappear. Oil palm development in West Africa served to relieve the animal fat industry in France. Moreover, the colonial agricultural service organized the so-called “international experience”, that led to the exchange of the best oil palm seeds and seedlings between French Africa, the Belgian Congo, and Malaysia.

Frank Veraart and Maliene Kip, Roots and Ramifications of Netherlands’ Foreign Fat Supply 1920-2020

Imports of resources affect economic, social, and environmental conditions elsewhere in the world. Industrialization and modernization of agriculture in the twentieth century increased this foreign influence. Application of foreign plant and animal oils in the Netherlands increased related to developments in export-oriented margarine and food industries, and intensive livestock farming. The paper presents an investigation into the development and dynamics of the Dutch imports of multiple resources of oil and fats. It analyses the size of these resources for the Dutch economy and the geographical distribution of their places of origin. By scrutinizing this data, it studies the growth, decline and spatial shifts in the supply of different oils and fats to the Netherlands. It also sketches issues of mutual dependence between the Netherlands and its

supplying areas, evaluating the impact and reliance of Dutch consumption on these resources. These overviews are combined with insights in the developments of the main applications in food and fodder industries. Technological developments allowing more exchangeability of these resources address issues of purchasing power of major industries. Insights of knowledge production and societal discussions on production in nutrition, food qualities and environmental issues connect to shifting interests in various oil and fat resources. The paper increases insights in the geographical scope of the social and environmental consequences connected to the foreign supply of oils and fats used in the Dutch economy.

Elena Kochetkova, Fat resources and food science in the Soviet Union, 1950-80s

The period after the WWII was filled with numerous attempts 'to catch up and surpass the West' in the manufacturing of food products in the Soviet Union. Along with notorious shortages and long lines in grocery shops and markets, Soviet history witnessed numerous experiments with food products, vitamins, minerals, and other scientific additives in laboratories and research institutes across the country. Various modifications of fat were the subject for experiments too and revolved around such projects as milk fat replacing in cheese making and using palm oil in numerous food products. The article will discuss the discourse and practice around these experiments to explain the roles that food science played in the Soviet Union on the one hand, and the contribution of socialist experiment in the development of fat science and production. In the first part of the article, I will discuss Soviet food politics and the place of food science between the 1950s and 80s. In the second part, I will examine various experiments at industrial enterprises and research institutes to demonstrate how socialist food politics extended out of deficit to the realm of food modernity. Soviet commentators often described the latter as progress and connected the industrial abilities to replace milk fat with palm oil and other substances as a progressive instrument to better feed the society and, simultaneously, save ('economize' in the language of the epoch) material resources. At that edge, Soviet food science was similar to that in many other countries even though it was embedded in the discourse about building communism.

Claiton Marcio da Silva, Designing fat sources in the Global South: The Nelson and David Rockefeller's IRI Research Institute (1950-2000)

The IRI Research Institute (IRI) was a philanthropic research institution founded by US multimillionaire brothers Nelson and David Rockefeller in 1950. Initially, the institute's purpose revolved around developing small-scale projects of agricultural technification in Brazil and Venezuela. The expertise developed by the institute over the course of the 1950s, however, expanded the IRI's area of activity in the following decades through contracts financed by the United States Agency for International Development (USAID) and the Alliance for Progress initiated by the John Fitzgerald Kennedy administration in 1961. Conceived on the premise of neo-Malthusian and anti-communist notions, the IRI adapted its approach to the context of the Cold War and the Green Revolution, in the belief that the improvement of the so-called underdeveloped nations would be based on the technical utilization of available natural resources,

combined with experiments in agriculture and livestock farming. The focus of this paper, therefore, is on the experiments to introduce exotic plants and animal breeds with a view to producing fats to supply the foreign market. In particular, the experiments on soybeans and the change in pig herds followed the demands of the international market, contributing to significant changes in animal management techniques, the clearing of forests to plant soybeans and, finally, the replacement of lard by soybean oil as the main oil consumed in the Global South.

Shakila Yacob, No need to be poor: Empowering rural development and sustainable palm oil agribusiness in Malaysia

In the late 1950s, the Malaysian government prioritized land reforms and development to reduce poverty. The Federal Land Development Authority (FELDA) played a pivotal role in establishing new settlements for landless rural dwellers, initially cultivating rubber, and later transitioning to oil palm. Malaysia adopted a unique approach, avoiding the socialized or collectivist ownership pattern prevalent in socialist countries. This study evaluates the state's role in developing the oil palm agribusiness sector, particularly focusing on FELDA's contributions. It examines issues related to land ownership and smallholder organization while highlighting FELDA's influential early leadership that shaped its growth. The article utilizes the principles of multifunctionality and social and solidarity economy (SSE) to analyze FELDA's strategy for poverty alleviation and development through land reforms and agribusiness diversification. While multifunctionality and rural development have been discussed in the European context, this aspect has been largely overlooked in Southeast Asia, particularly in Malaysia. Surprisingly, despite FELDA's adoption of the multifunctionality approach long before it became a buzzword, existing studies on FELDA fail to investigate this important factor. Therefore, this research seeks to address this gap and shed light on the multifunctional role played by FELDA in rural development and its significance in shaping Malaysia's agribusiness sector, in line with the principles of social and solidarity economy (SSE). By examining FELDA's approach, which prioritizes smallholder support and community empowerment, this study aims to highlight how its multifunctional initiatives align with the values of SSE. Promoting equitable development and poverty eradication, FELDA's efforts have significantly contributed to Malaysia's position as a global palm oil supplier.

Matthias Heymann, Meanings of sustainability: The invention of Sustainable Palm Oil

Initiated by the World Wild Fund for Nature (WWF), a large range of actors joined in the 2004 to form the Roundtable on Sustainable Palm Oil (RSPO). The RSPO is a not-for-profit, international membership organisation that unites stakeholders from the key sectors of the palm oil industry and NGOs to create sustainability standards and licensing procedures in Malaysia. This odd coalition became possible, because NGOs aimed at fighting tropical deforestation caused by the expansion of palm oil plantations, whereas the palm oil industry sought to improve the bad reputation of palm oil to safeguard and improve its production and sales to western customers. What sustainable palm oil precisely meant was to be negotiated and defined by all interested actors involved. On Tuesday, 11 November 2008, the first 500 tonnes of certified sustainable palm

oil from Malaysia arrived in Rotterdam. This first shipment was produced by the Danish-led plantation company United Plantations (UP) in Malaysia and imported by the Swedish-Danish palm oil processing company AarhusKarlhamn (AAK). Sustainable palm oil claims, however, caused increased attention and negative publicity. NGOs not involved in the RSPO, such as Greenpeace, took a very critical view on claimed sustainable palm oil and unveiled continuing unsustainable practices and the limitations of RSPO sustainability criteria. Still, in the long term, strong public scrutiny drove RSPO to adjust and expand its standards and force especially large plantation companies to improve their environmental and social practices. This article will provide a historical account of the invention and development of sustainable palm oil by the RSPO and the conflicts about and meanings of sustainability it negotiated and produced with particular attention to the pioneering companies United Plantations and AarhusKarlhamn. The article will be based on RSPO documentation, oral history interviews with involved actors and published literature.