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Will Mining Mammoth Tusks in the Russian Arctic Help Preserve African Elephants?

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Arctic zone of Russia, mammoth tusks, ivory, Republic of Sakha (Yakutia), conservation of African elephants, indigenous peoples, conservation of biodiversity.

Abstract

Objectives *– The article explores the relationship between mammoth fossils and the number of African elephants. The research is aimed at solving two interrelated fundamental problems: the development of mechanisms to support traditional crafts of the indigenous peoples of the North in the field of extraction and rational use of mammoth fauna, as well as a methodology for replacing natural resources by using fossil mammoth bones instead of exterminating the tusks of living elephants.*

Theoretical Framework *– The concept of sustainable development, the theory of substitution of natural resources, conservation of biodiversity, the concept of Benefit Sharing Paradigm in mining in the Arctic.*

Method *– The methods of systematic and economic-ecological analysis, statistical, computational and analytical methods, sociological methods, conducting expeditions, methods of ethnological monitoring, cost-benefit assessment, and substitution of natural resources are used.*

Results and Discussion *– The extraction of fossil tusks of extinct mammoths in the Republic of Sakha (Yakutia) allows us to consider it as a substitute natural resource. A mechanism is proposed to preserve the elephant population in the wild by replacing ivory with tusks of fossil mammoths. It has been established that on average 10 kilograms of mammoth bone can save one elephant, the export of even half of the mammoth tusks mined in Yakutia allows saving 60,000 African elephants annually.*

Research Implications – The task of integrated use of mammoth tusks and conservation of elephant populations is being solved, and methods of preserving global biodiversity are being developed.

Originality/Value *– Mammoth tusks are considered in various aspects: as a scientific and cultural value; as an object of trade; the sphere of employment and income of the indigenous peoples of the North, as a resource replacing the needs and demand for ivory.*

Introduction

There is a close connection between mammoth remains and African elephant numbers. The ivory of the African elephants has long been highly valued. The ivory trade dates back to the 14th century. Before the arrival of Europeans in Africa, few elephants were hunted. With the arrival of Europeans armed with powerful guns, a massacre unfolded.

Ivory brought great profits. During the colonization of Africa, between 800 and 1,000 tonnes of ivory were shipped to Europe each year to make piano keys, billiard balls, and other items. Tusks were used in many countries for the production of medicines, jewellery, souvenirs, for rituals and religious ceremonies. They were used to make book covers and carved figurines. By the 1970s, Japan consumed approximately 40% of world trade, with another 40% consumed by Europe and North America. China at that time became the largest consumer of ivory products in the world, where up to 70% of the ivory ended up.

The fashion for products made from elephant tusks led to a sharp reduction in their numbers, starting in the 1970s. To preserve elephants, special protected areas and national parks were created. In 1989, a complete ban on the ivory trade was introduced in accordance with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and in 1990 there was an international agreement was adopted to ban the trade in ivory, which provoked increased demand for mammoth ivory on the world market.

This has played a positive role in elephant conservation, but with continued demand for ivory, the illegal ivory trade, and poaching flourished, putting elephants at

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risk of extinction. Thousands of elephants are killed every year for their tusks, despite a ban on the ivory trade. It is estimated that a fifth of Africa's elephants could be wiped out in the coming decades if poaching continues at current rates.

The available mammoth remains in the Russian Arctic and in the Arctic regions of Yakutia have made it possible to discuss the possibility of replacing elephant ivory with mammoth ivory in order to preserve elephants and global biodiversity. The ban the ivory trade served as an impetus for the activation of mining and trade in mammoth ivory in Yakutia. The ban on the ivory trade itself arose because of the potential to replace elephant ivory with mammoth ivory [1,2]. These researchers note that without the import of "ice ivory" the turnover of "blood ivory" will significantly increase. The main theoretical problem is to balance the relationship between the renewable resource of ivory and the non-renewable deposits of mammoth ivory.

The trade is taking advantage of the global ban on ivory to capitalize on growing demand for mammoth tusks, which are a legal natural substitute for ivory and this indirectly protects elephants. There are some doubts about the use of this approach, since mammoth tusks can serve as a cover for illegal ivory trafficking [3]. Bending [4] examines the relationship between mammoth harvesting and elephant conservation as a natural resource replacement issue. Critics of the mammoth ivory trade, including Save the Elephants and the International Fund for Animal Welfare, say it normalizes the use of ivory and therefore encourages elephant poaching.

Mammoth tusks have been mined in the resource-rich Yakutia region of Siberia for hundreds of years. The last isolated populations disappeared about 4,000 years ago, likely due to a combination of climate change and hunting. Yakutia contains from 85% to 90% of the world's reserves of mammoth tusks. Mammoth tusks are in great demand, especially in Asian countries. In China, due to the ban on elephant ivory, mammoth tusks are especially valued.

The extraction of mammoth ivory in the Republic of Sakha (Yakutia) dates back to the 17th century, and data on the volume of tusk reserves in Yakutia appear in the 19th century [5]. In Soviet times, fishing and agricultural collective farms of Yakutia organized cooperatives to collect mammoth ivory and supply it to the international market (for example, a government contract with Japan on the supply of souvenir products from mammoth ivory.

The intensive development of mammoth ivory resources occurred in the late 1970s, and the so-called "mammoth boom" and "tusk fever". A phase of active extraction of mammoth tusks occurred in the second half of the 1980s, and in the 1990s there was a noticeable escalation of this process. Nowadays, tusk harvesting has become a lucrative semi-legal large-scale mining business, supplying mammoth ivory to China and other foreign markets.

As a result, the liberalization of export opportunities and the formation of a "wild" market marked the beginning of the so-called "tusk boom" in the Arctic regions. The rapid rise in prices for mammoth ivory has significantly affected the way of life and the system of priorities in economic activity, primarily of the indigenous population. With the market transformations in the Russian Arctic in the 1990s, the extraction of mammoth remains made it possible to mitigate the social consequences of the ongoing reforms in terms of employment and income generation for the local population. This coincided with large-scale socio-economic transformations in the former USSR [6].

As permafrost melts beneath the Arctic tundra, more remains are being exposed and the trade in mammoth tusks, which are larger and more valuable than ivory, is growing. The study of the extraction and rational use of mammoth remains, including the development of traditional crafts of the indigenous peoples of the North, has been reflected in the literature [7-9]. Research has also covered the legal regulation of the collection of mammoth remains in Russia and the development of legislation regarding planning the production and consumption of mammoth remains in Russia [10,11].

The extraction of mammoth tusks is considered as a type of traditional environmental management of the indigenous peoples of the North [12]. Sleptsov [13] shows that the extraction of mammoth tusks is a traditional activity of the indigenous peoples of the North in the Republic of Sakha (Yakutia). Grigoriev [14] links the extraction of mammoth remains to the development of local communities in the Arctic territories of Yakutia at the end of the twentieth century.

The extraction and use of mammoth tusks can be considered in different ways: (a) as a scientific and cultural value; (b) as an object for export and trade; (c) as a sphere of activity, employment, and income of indigenous peoples of the North; and (d) as a resource that replaces the needs and demand for ivory and can save African elephants as a raw material for carving, souvenirs, and other products.

The mammoth has scientific and cultural value [15,16]. Mammoth ivory can be considered from the point of view of carving as an element of the national identity of the peoples of the North [17] and as the materials for hunting tools in ancient times [18], etc.

This article considers the extraction of mammoth ivory as a natural resource, the use of which allows for the conservation of African elephants and global biodiversity. as well as from the point of view of the development of mechanisms to support traditional crafts of the North in terms of the extraction and rational use of mammoth remains, which is of great importance for the creation of new jobs, improving employment, fighting poverty.

The article puts forward the idea of replacing elephant ivory with mammoth ivory. This solves the problem of integrated use of mammoth tusks, ivory and the preservation of the elephant population. The purpose of the study is to develop a methodology and mechanisms aimed at solving two interrelated fundamental problems: the replacement of natural resources by using mammoth tusks instead of the tusks of living elephants and supporting the traditional crafts of the indigenous peoples of the North in the field of extraction and rational use of mammoth remains. Thus, this area of research can be described as "Mammoth tusks save elephants."

Methods

Interest in mammoth tusks within the framework of social science and humanities research has increased relatively recently. The study is based on the concept of natural resource substitution. This approach is used,

for example, when replacing natural resources (coal, hydrocarbons) in the economy with renewable energy sources.

The article is based on an interdisciplinary approach, the use of methods and approaches used in economics and management, ethnology and palaeontology, social research, and methods for monitoring Arctic territories. In relation to the extraction of mammoth tusks, the study is based on the concept of sharing benefits (Benefit Sharing Paradigm) of stakeholders (mining companies, local authorities and indigenous peoples of the North) during mining in the Arctic zone of Russia [19,20]. The research is also based on the application of project management methodology.

Assessing the effectiveness of replacing elephant tusks with mammoth remains requires a comprehensive assessment of the expected results. Among these results is the conservation of the elephant population in the wild; methods of systemic and economic-ecological analysis, statistical, calculation and analytical methods and others are used. As part of the study, sociological research methods and the method of field surveys (conducting expeditions, field research) in the areas of mammoth extraction, traditional residence and traditional economic activities of indigenous peoples were used. The research is related to the development of methods for ethnological monitoring of projects, information technologies, and assessment of the impact of permafrost thawing processes on the processes of extraction of mammoth remains.

The study used methods for assessing costs and benefits (economic, social, climatic, etc.) in the development of traditional environmental management in the Arctic zone of Russia based on the extraction and rational use of mammoth remains.

Results

Even in ancient times ivory was in great demand in the world. For example, the throne of Russian Tsar Ivan the Terrible was covered with ivory in 1547.

At the end of the 19th century and until the 1930s, tusks from more than 40,000 elephants were exported from Africa annually. By 1880, when the ivory trade reached its peak, 60–70,000 animals were killed annually by hunters. In the 1920s, about 600 tonnes of ivory were used annually throughout the world for various crafts. A slight decrease in the intensity of elephant hunting in 1930s–1950s was associated with the creation of large national parks and reserves, which had a positive effect on the number of these animals. However, from 1970 to 1980, the number of African elephants sharply decreased from 1.2 million to 0.55 million.

Despite the measures taken to ban the trade in ivory, demand has led to an increase in poaching. For example, between 2010 and 2014, the price of ivory in China tripled. In March 2021, the African forest elephant (Loxodonta cyclotis) and the African bush elephant (Loxodonta africana) were listed as critically endangered on the International Union for Conservation of Nature Red List of Threatened Species). To save the elephant population, various measures can be taken including trade bans, refusal of consumption, replacement of natural resources, conservation and protection of ecosystems where elephants live, increasing public awareness, awareness, development of education and culture.

In 2016, China announced a ban on ivory trade, and in 2017, ivory carving factories were closed. As a result, prices for raw ivory fell from $1,322/kg in 2015 to $660/kg. France also announced an ivory ban in 2016. In 2017, Hong Kong introduced a bill to ban the import and export of processed and unprocessed ivory from 2021. In 2022, the Canadian government decided to tighten regulations on the ivory trade, which involves banning its sale.

Vermont became the 12th US state to ban the sale of ivory in 2022. Ivory ban legislation is also currently being considered in Nebraska, Pennsylvania, Delaware, and Massachusetts. Other measures to preserve the elephant population include not purchasing ivory products. Note that in 1973, Kenya completely banned elephant hunting due to ivory production. In Zimbabwe, killing an elephant carries a 15-year prison sentence. In practice, there are some positive examples of successful fight against poaching and the illegal trade in ivory. In January 2024, Nigeria took action to protect its dwindling elephant population as part of its fight against illegal wildlife trade, destroying 2.5 tonnes of seized elephant tusks valued at more than 9.9 billion naira ($11.2 million).

Over the past three decades, Nigeria's elephant population has declined from 1,500 to fewer than 400 due to poaching, habitat loss, and human-elephant conflict. Most of the ivory is exported in large quantities - up to 10 tonnes each. The largest quantity of ivory is currently smuggled out of Uganda through the seaport of Mombasa, with ports in Kenya and Nigeria also commonly used.

The struggle to preserve the elephant population has led to an increase in demand on the world market for an analogue of elephant ivory—mammoth ivory. There are significant reserves of mammoth ivory in the Russian Arctic, with more than 85-90% concentrated in the Republic of Sakha (Yakutia). Resources of mammoth tusks are estimated at 450–520,000 tonnes. The North Yakut mammoth-bearing province covers the coast of the Arctic Ocean from the Khatanga to the Kolyma Bay, the lower reaches of large rivers: Lena, Yana, Indigirka, Alazeya, Kolyma, as well as the New Siberian Islands. Collecting mammoth remains is carried out in the northern coastal regions of Yakutia. The annual volume of legal mining of the remains of mammoth in Yakutia is about 150 tonnes, of which 96% are mammoth tusks.

Climate change and the resultant thawing of the permafrost (collapse of riverbanks, changes in the tundra) are leading to significant new opportunities for mammoth excavation. In the work [21], a hypothesis about the impact of climate change in the Arctic zone of Russia on traditional crafts of indigenous peoples, including the extraction of fossil mammoth bone, was put forward and confirmed based on the analysis of empirical data. It is shown that the degradation of permafrost rocks under conditions of climate change contributes to the development of indigenous peoples' activities for the collection of mammoth bone.

Currently, more than 700 licenses for collecting mammoth ivory are registered in the Arctic regions of Yakutia. Mammoth tusks are a valuable export commodity, the extraction of which involves thousands

of households in the Russian Arctic. The total area for collecting mammoth remains in Yakutia is 41,607 km2.

Harvesting mammoth tusks is a traditional activity of the indigenous peoples of the northern regions, occupying an important place in their lives for many centuries. Mammoth tusks are a highly sought after commodity for export, impacting the well-being of thousands of households in the Arctic territories. The "Strategy for the Development of the Arctic Zone in the Republic of Sakha (Yakutia)", adopted in 2020, sets the task of extracting and processing mammoth tusks, which will create new jobs for indigenous peoples, increase their income, and use these essentially new minerals for science, culture, souvenir production.

A Resolution of the Sakha State Assembly No. 884 "On the legal regulation of the collection, rational use, and sale of mammoth remains" formulates the mechanism to support the traditional crafts of the indigenous peoples of the North in terms of the extraction and rational use of mammoth remains. From the perspective of the indigenous peoples of the North, the extraction of mammoth tusks as a type of traditional craft can be considered as a measure to combat poverty [22], as a source of income and improve the quality of life of the local population, and regulate socio-demographic processes [23].

Currently, the indigenous peoples of the North are being supported in the development of traditional crafts in the extraction and use of mammoth ivory [24]. It is also necessary to develop special economic measures to and support these activities in the Arctic and the indigenous peoples of the North. We are talking about the development of mechanisms for the rational use of mammoth remains QWERin the Arctic regions of Russia, primarily in the Republic of Sakha (Yakutia), mechanisms for the legalization and development of the mammoth ivory market through auctions, economic regulation in this area, the development of technologies and production facilities for processing mammoth tusks.

The article [25] discusses methods of economic regulation in the field of extraction and export of mammoth bone, methods of greening the crafts of indigenous peoples, which are aimed at modernizing the institutions of development of Arctic territories in terms of reflecting and protecting the interests of their inhabitants.

From the point of view of exports from the Arctic zone of Russia and the commercial turnover of mammoth tusks, it is necessary to improve regulatory regulation in this area. This concerns the attribution of mammoth tusks to scientific and cultural values of special importance, which requires special permits [26].

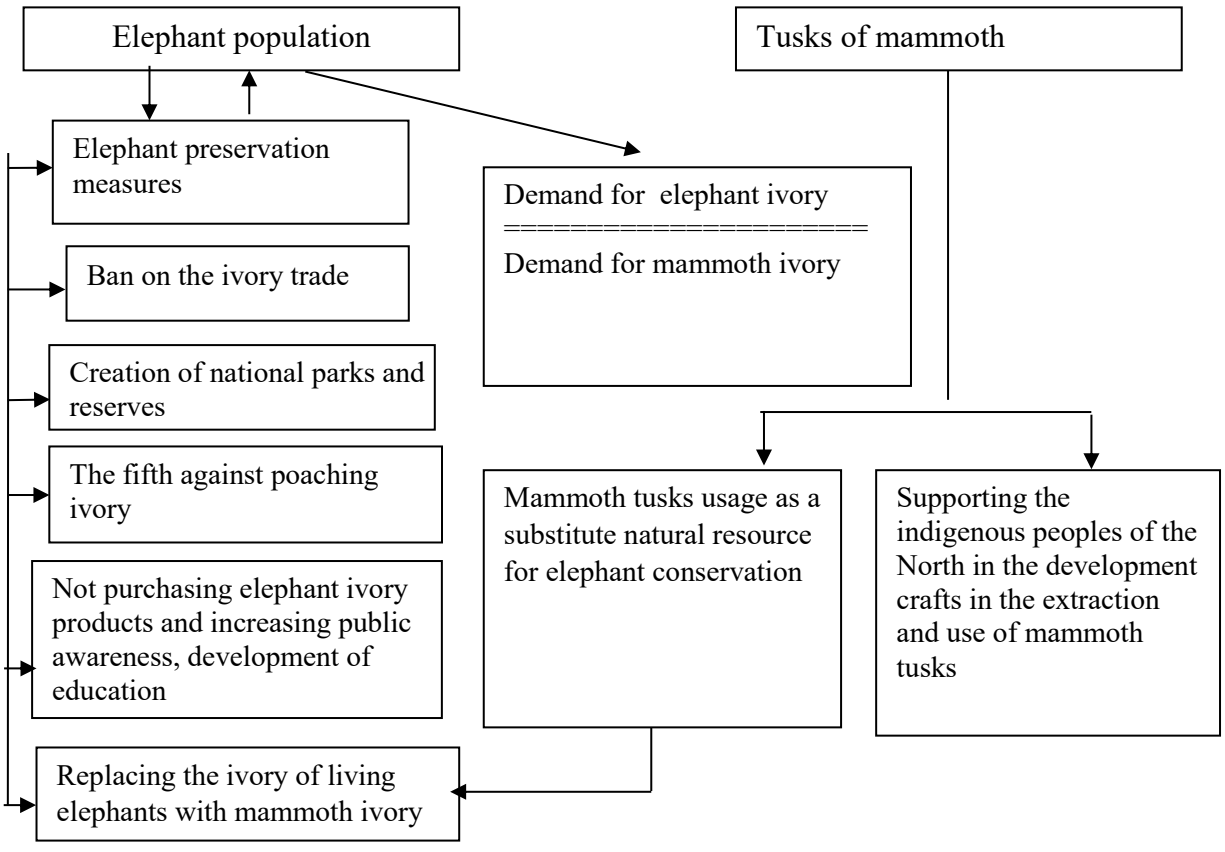

Figure 1. *Scheme of the use of mammoth tusks to preserve the elephant population and support the traditional crafts of the indigenous peoples of the North.*

Source: compiled by the authors.

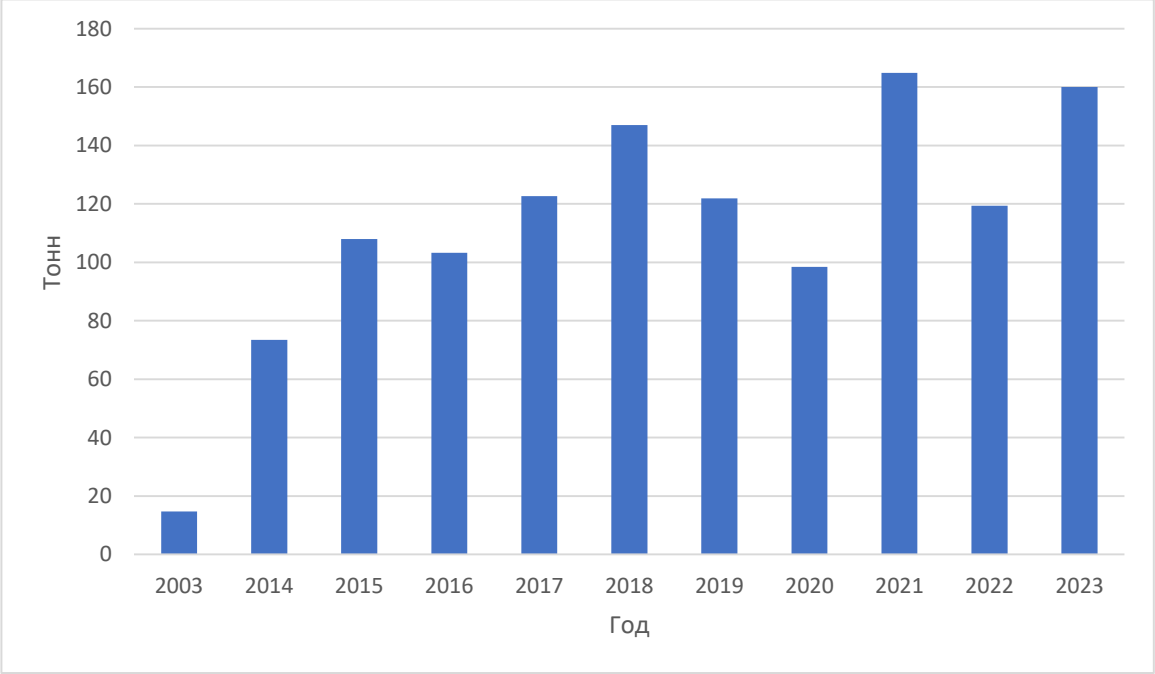

Figure 2. *Dynamics of extraction of mammoth tusks and mammoth ivory in the Republic of Sakha (Yakutia). Source: compiled by the authors.*

Figure 1 shows a diagram of the use of mammoth tusks as a replacement resource for preserving the elephant population and supporting the traditional crafts of the indigenous peoples of the North.

Figure 2 shows the dynamics of production of mammoth tusks and mammoth ivory in the Republic of Sakha (Yakutia) for 2003–2023. As can be seen from this figure, the official extraction of mammoth ivory has increased over the 20 years from 2003, when licensing for this activity was introduced, to 2023, by 10.9 times (from 14.7 tonnes in 2003 to 160 tonnes in 2023). In addition, it is estimated that another third of this volume may come from illegal mining of mammoth tusks (without a license).

The market for the extraction and export of mammoth remains in Yakutia is estimated at 6 billion rubles ($67 million) per year. Russia exports more than 120 tonnes of mammoth tusks annually. In 2023, the export of mammoth tusks from Russia to China doubled compared to 2022. The Netherlands and Hong Kong also buy this product. Currently, Russia is the only supplier of mammoth tusks in the world.

Mammoth tusks are a highly liquid commodity, the commercial turnover of which determines the well-being of thousands of people living in the Arctic zone of Russia. Considering that supplying an average of 10 kg of mammoth ivory to the world market can save one elephant from poaching, exporting even half of the tusks produced in Yakutia could save the lives of more than 60,000 African elephants per year. Thus, this makes it possible to preserve global biodiversity and support the traditional crafts of the indigenous peoples of the North.

Extraction of mammoth tusks, including obtaining a license, difficult natural and climatic conditions in the mining areas, is a very complex and labor-intensive task. Therefore, the price of such tusks is constantly rising. On average, the price of mammoth tusks, which can be used to make jewellery, ranges from 500 rubles ($6) up to 1500 rubles ($18) per kilogram. A good, dense and well-preserved mammoth tusk can cost more than 40,000 rubles ($450) per kilogram, and a single tusk can weigh 100 kilograms.

The cost of delivering tusk from a deposit to, for example, Moscow can be $15 per kilogram. Therefore, tusk hunters take only the most valuable, easy to sell materials. The remains that tusk hunters throw away could decorate the exhibitions of many museums. Mammoth ivory is used by jewelers, artisans, and carvers. Mammoth tusks are widely used as an ornamental material. The cost of a figure 60 cm high can reach more than $22,000. Among the rich in China, it is now considered prestigious to have railings in the house not made of gold, but of mammoth ivory.

The age of mammoth ivory can range from 10,000 to 40,000 years old. Mammoth ivory is stronger than ivory and has an unusual color range - from milky white and pink to blue-violet. As noted, the extraction of mammoth ivory in the Arctic zone of Russia is carried out mainly in Yakutia and Chukotka.

From a commercial point of view, the legal framework for the extraction of mammoth ivory in Russia is not regulated. Nowadays, tusks are often considered as paleontological remains that have exclusively cultural value. This creates conflict situations related to the export of tusks, complicates commercial activities, and has a negative impact on the financial situation of local residents involved its extraction. Currently, collecting tusks has turned into a profitable and, in some cases, semi-legal business, supplying mammoth ivory abroad, for example, to China.

In May 2022, a court verdict was issued in Kazakhstan in the case of smuggling mammoth tusks and prehistoric rhinocero horns through Kazakhstan to China. The remains of ancient animals were transported from the Republic of Sakha (Yakutia). Their weight was more than 5 tonnes, and their value exceeded 1 billion tenge ($2.4 million). In December 2022, an attempt to smuggle more than 1 ton of mammoth tusks worth 16 million rubles ($178,000) was stopped in the Smolensk region of Russia.

In May 2023, smugglers were detained in Belarus with 3.5 tonnes of Yakut mammoth tusks from Russia with a total value of $1.8 million. Mammoth tusks obtained in Yakutia have been exported illegally to the US, Western Europe, and South Asia. A Belarusian enterprise purchased cheap poor-quality tusks and expensive high-quality tusks in Russian and sent them via Latvia. The export of which from Russia without certification is prohibited. Similar cases are recorded during attempts to smuggle 11 mammoth tusks from the Far East of Russia. Such a batch of tusks, for example, was exported in March 2022 from Yakutia to Kazakhstan, 53 tusks worth 8 million rubles. ($89 thousand).

Residents of Khabarovsk and Ussuriysk in the Far East of Russia in June 2023 tried to remove 16 tonnes of mammoth tusks worth 192.4 million rubles. ($2.2 million) to China and the Netherlands. Tusks and other mammoth fragments were purchased in Yakutia for further export outside Russia.

Therefore, it is important to reflect in legislation the concept of “mammoth ivory” as an object of commercial circulation. This situation leads to significant financial losses for the state budget, is a factor in the development of illegal trade in mammoth, and damages the unique archaeological and paleontological heritage of the North. The Republic of Sakha (Yakutia) has the opportunity to become a world leader in the field of research and development for the extraction and rational use of mammoth remains by developing a system that includes search, excavation (mining), transportation, storage, supply of mammoth ivory to the world market, as well as display of paleontological objects.

The legalization of domestic and export trade in mammoth remains will contribute to obtaining a significant socio-economic effect for indigenous peoples by creating an open transparent trading system, including for export, mammoth tusks, semi-finished products and final products, developing a system of legal regulation of the collection and circulation of mammoth, the creation of workshops for processing mammoth ivory in a number of Arctic regions of Russia.

The development of economic mechanisms for legalizing and regulating on the basis of auctions for licenses to extract the material, financial support, creating new opportunities for indigenous peoples, including those related to the processing of mammoth remains, the production of souvenirs, and the development of ethnological tourism. So, the research results show that extinct mammoths can save living elephants.

Conclusion

Despite measures taken to protect elephants, including a ban on the ivory trade and the creation of a national park system, the population of African elephants continues to decline as a result of increased poaching. The presence of significant amounts of mammoth ivory in the Arctic zone of Russia, which are estimated at 450-520,000 tonnes, allows us to consider tusks of mammoths as a replacement natural resource for the purpose of elephant conservation. Mammoth ivory is in significant demand, especially in Asia.

The extraction of mammoth tusks in the Republic of Sakha (Yakutia) for 2003–2023 shows that the official production of mammoth ivory has increased more than 10-fold and currently amounts to more than 160 tonnes per year. Considering that supplying an average of 10 kg of mammoth ivory to the world market can save one elephant from poaching, exporting even half of the tusks produced in Yakutia could save the lives of more than 60,000 African elephants per year. Thus, this makes it possible to preserve global biodiversity and support the traditional crafts of the indigenous peoples of the North.

The legalization and development of the mammoth ivory market, domestic and export sales of mammoth ivory in Russia will contribute to a significant socio-economic improvement for the indigenous peoples of the North, through the creation of an open trading system, raw mammoth tusks, semi-finished and finished products, and the creation of workshops for processing mammoth ivory in a number of Arctic regions. This approach is aimed at supporting the traditional crafts of the indigenous peoples of the North and can address many of the economic and social problems of the local population. Conditions can be created for the harmonization of relations between local governments, business and indigenous peoples in the development of the Arctic [27].

The results of the study contribute to the conservation of global biodiversity, the conservation of African elephants by replacing the tusks of living elephants and reducing their poaching in African countries and the use of mammoth remains, the volume of production of which in the Russian Arctic may increase in the face of climate change and thawing permafrost. Promising areas of future research include assessing the impact of climate change and the thawing permafrost in the Arctic on the extraction of mammoth tusks and their use as a substitute natural resource for elephant conservation.

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