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Rebranding of the Eurasian nomadic civilization: the importance of the experience of historical nomadism in the context of climate change and aridization of the territories of Kazakhstan.

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Abstract. This article is introducing the ideas of implementing thousands of years old know-hows of the nomadic pastoralists of Kazakhstan to current ecological conditions and challenges of our region. The nomadic pastoralist lifestyle historically has developed in the conditions of arid and semi-arid regions of the Eurasian continent (Eurasian Steppe). This lifestyle was designed and perfected to deal with chronic seasonal droughts and shortages of water. It relied on moving large herds of livestock, mobile architecture and infrastructure, and nomadic technologies. In the modern era, when the cities are overcrowded, while the economy and food security rely mostly on agriculture, vast arid areas of land remain unused, producing zero value both for humanity and the planet Earth. These wastelands were once a thriving ecological system, where the nomadic pastoralism served as an engine for their sustainability. But, once the nomadism was uprooted from those areas, and the population was moved towards urban areas and an agriculture-based economy, they degraded into lifeless deserts. By using the 21st century's technologies, architecture, engineering, energy sources, and materials, it is possible to reintroduce the once-vital nomadic pastoral lifestyle into those empty wastelands, turning them once again into vibrant ecological regions.

Keywords: eco-villages, eco-auls, yurt, nomads, nomadic pastoralism, arid regions, nomadic architecture.

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Introduction

Biosystems are extremely unstable in the arid and extra-arid regions of Eurasia, with increased solar activity and sharp continental temperature differences, where repeated droughts, extreme shortages of water and vegetation, and wind erosion processes are typical.

This significantly limits human capabilities, requiring adaptation through special social and technological solutions. In the historical perspective, starting from approximately four thousand years ago, the basis of existence in these conditions became nomadic pastoralism. The Eurasian nomadic pastoralism utilized the husbandry of the five animals – horses, camels, cows, sheep and goats, which served as the origin of nomadic civilizations.

Figure 1. Approximate geographic span of the Eurasian Steppe. Map by D. Baidaralin

In the modern world, despite its relevance, this method of economy remains underestimated in the large, previously nomadic zones, such as Kazakhstan and regions around the Ponto-Caspian Basin. Attempts to introduce agriculture in these conditions are not only ineffective, but also lead to long-term negative consequences: increased soil erosion, desertification, destruction of biodiversity, and deterioration of the steppe, semi-steppe, and desert landscapes.

In the territory of Kazakhstan, with an annual atmospheric precipitation of less than 400 mm and limited water reservoirs, nomads needed large pasture areas for large and small pastoralism. In such arid zones, the population was small, 1-1.5 people per 1 sq. km. The marginal (peripheral), sub-arid zones with a more favorable climate and diverse vegetation were more often areas for settled agriculture, where a semi-nomadic economy was preserved (Pershits, 1961; Markov, 1976). These territories were characterized by a great diversity of economic structures: Central Asia, Western and Southern Siberia, the foothills of Central Asia, river valleys, and lake regions on the border of the arid zone of Eurasia; these marginal zones also belong to the semi-arid (steppe) zones (see map 1). In such places, the ancient urban culture was preserved, through which the Great Silk Way passed with its trade routes and places of travelers' stops (see maps 5-6).

The methodology

The climate of Eurasia formed in the post-glacial era, which in turn was formed in the Holocene Era (approximately from 10,000 years ago to the present), changing significantly over the past millennia (see Table 1 below). This led to the stabilization of the vegetation and soil cover and their

composition, as well as the formation of the water networks, watercourses, rivers, reservoirs, etc. The development of climate on seasonality, horizontal and vertical zonality (Shnitnikov, 1957; Climate of Kazakhstan, 1959; Chupakhin, 1968).

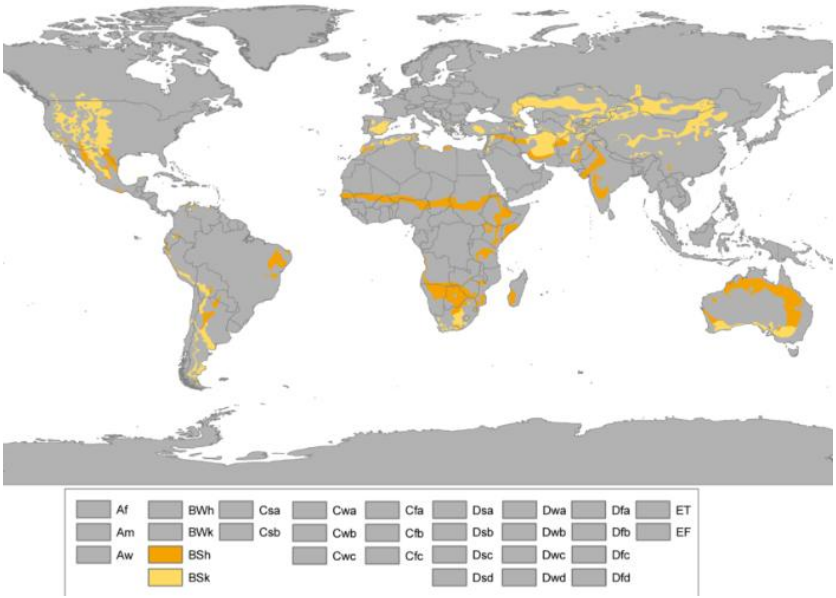

Figure 2. Map 1: Semiarid climate areas – semi-deserts, steppes, sometimes forest-steppe temperate geographical zone.

There are several controversial discussions among various researchers about climate change:

1. The climate fluctuations in Eurasia were cyclical.
2. The Peterson-Shnitnikoz hypothesis, 1800-1900-year cycles of climate fluctuations.
3. A.V. Shnitnikov believes that this rhythm is divided into phases. The 1st, cool-humid phase of 300-500 years, an increase in river runoff, a rise in lake levels, and an increase in climate humidification. The 2nd phase was a stage of dry and warm climate for a period of 1000 years, leading to the retreat of glaciers, the drying up of swamps and weatlands, a decrease in water spaces, and aridization of the climate in general. Shnitnikov suggests that between them there were transitional periods of 100-300 years (Shnitnikov, 1957).
4. Movement from one landscape to another, most sensitive to climate changes - wetting or drying, cooling or warming - marginal zones could be absorbed by areas, from them new marginal zones could emerge along the periphery (Gumilyov, 1966; Veresh, 1979).
5. Those who denied the cyclicity of climate recognized non-periodic fluctuations (Laduri, 1971). Changes in precipitation led to shifts in zones. The general drought in the Afro-Asian region in the 6th and 2nd millennia BC stimulated the development of agriculture and cattle breeding (Nature and Resources, 1984). Similar droughts of the 60s-80s. The 20th century in North Africa led to the aridization of the savanna-Sahel zone, desertification, displacement of agriculture, and migration of the population to cities, changing their way of life and nutrition (Skury, 1984). Climate change in marginal zones has historically led to adaptation of economic activity, life, and transition to nomadism. In Kazakhstan, marginal zones around rivers, lakes, and foothills have been places of a combination of settled and nomadic life.

Table 1. Types of nomadic economy in terms of regional characteristics
(compiled by the author based on the book by Masanov N.E. Nomadic civilization of the Kazakhs, 1995)

№	Type of nomadic economy	Material production	Dwellings	Water resources
1	**1st type of nomadic pastoralism is intensive.** Western and part of the Central regions of Kazakhstan - the extra-arid zone is arid deserts, semi-desert regions without natural reservoirs with artificial sources of water, and the organization of production had its own characteristics. In the arid regions of Karkaralinsk and Atbasar, cattle were 8-10%, sheep 64-68%, camels a larger %, the rhythm of migration was increased, the amplitude of migration was frequent with short stops, and labor costs were required to provide cattle with water. In winter, they also arrived in waterless and snowless places, wandering all year round. This type of economy had its own features, lifestyle, social, production, psychological relations, organizations, and values. The status of a nomad had a high status in the trend of nomadic culture.	The basis is nomadic pastoralism and the material cultural heritage of the nomads of the West-Central regions of Kazakhstan. There was no agriculture or fishing.	Yurts, tents, residential wheeled carts. Basic stationary settlements.	Water was extracted from underground soils by means of captage, digging wells. In the 1st type with draw-wells, extended communities prevailed.
2	**2 types of nomadic pastoralism - moderate.** Southern, Eastern, and North-Eastern regions of Kazakhstan, nomads occupied mountainous and foothill areas, forests, steppe zones with developed, natural surface water bodies and summer precipitation. There were no wells. The rule of the first usage of water bodies (first come, first served). In Eastern and North-Eastern, Central Kazakhstan, the volume of the economy was significant. In the Akmola region, water supply was above 66%, the radius of migration was 20-50 km one way with 3-10 stops. The speed of migration was less in relation to that of the 1st type, the stops were long, and the rhythm of migration was slow. In the summer, they migrated no more than 13-16 km per day. In Aktobe, Kostanay, and Pavlodar regions, which were rich in vegetative environment and water bodies, cattle predominated (23-30%) and sheep (38-46%).	2nd type of nomads with natural water usage, non-pastoral farming practices, high costs of labor and material supplies, and stationary dwellings predominate; they live sedentary in winter.	In winter, they farmed stationary for 3-6 months, and permanent dwellings prevailed: stone, wooden, turf, and raw clay. Household items and utensils consisted of materials unsuitable for transportation. They were engaged in farming and fishing.	In water reservoirs, when watering 500-1000 sheep, 2-3 people release them in batches of 300-500 heads per hour. In type 2, there were significant herds of sheep and horses. There is an order for watering in natural water sources (Ishchenko, 1928): 10-15 camels were watered first, and they drank carefully, without muddying the water. Then 10-15 horses (before sheep, since they are very fastidious). The last in line were batches of 15-20 sheep and goats, who are not very picky, and who stir up the water with their hooves. In type 2, large groups of communities roamed, with natural water reservoirs, and the equality of the two forms of communities.

The Kazakh people, numbering over 3.3 million in 1897, are an example of nomadic civilization. Contemporary urbanization and increasing environmental change require the study of the historical experience of nomads, especially in the creation of mobile architecture and infrastructure, soil regeneration through pastoralism, and settlement systems.

The map of migration of Kazakh Zhuzes (nomadic tribal unions) developed by the author shows the influence of climate on nomadism, housing architecture, and water supply. There are two types of nomadic economy (see Table 2): intensive in the arid western and central regions (the Younger and part of the Middle Zhuz), and moderate in the mountainous, forest and steppe southern, eastern and north-eastern regions (the Older and part of the Middle Zhuz).

Zhuzes, as a single organism, contributed to the restoration of the ecosystem. The experience of nomads is studied by modern researchers such as A. Savory (Permaculture and holistic management), M. Akysh and M. Tuyakbaev (New Nomads and the Great Steppe), ecologist and geophysicist Zimov S.A., architect D. Baidaralin, etc.

Various forms of nomadic pastoralism depended on types of system of water usage and how it was extracted; the area, longitude, modes and rhythm of nomadic migrations; the predominance and differences in the proportion of livestock species, agriculture and social form of labor. From this, we observe social forms of organization, socio-economic features, and various forms of material cultural value (Masanov, 1989). For a deeper understanding of the nomadic pastoralist way of life, we will consider the migration features of the main Zhuzes, compiled by the author in the tables and maps of the migration movement of the three Kazakh Zhuzes: Senior, Middle and Junior.

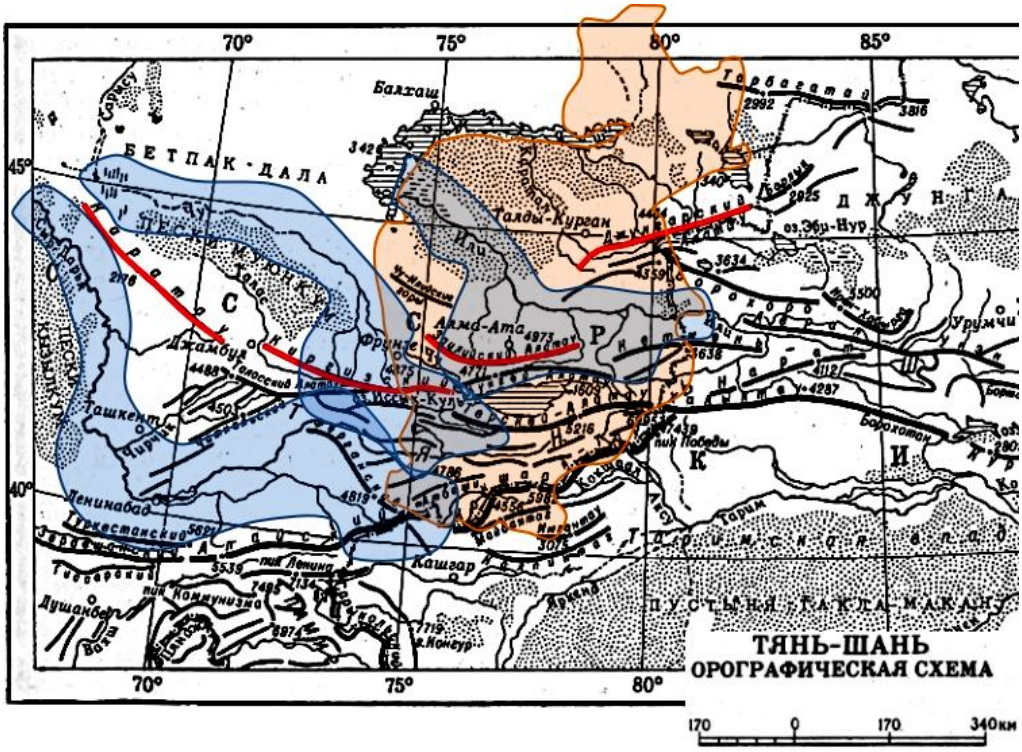

Figure 3. Map of migration of the Kazakh nomads of the Senior Zhuz (tribal union).

Orange color: main migrations area, blue color: main river valleys, red lines: main mountain ridges. Compiled by the author per Masanov N.E.

The map of the Senior Zhuz covers the mountainous and foothill areas of the Dzungarian and Zailiysky Alatau, the Kyrgyz Range and Karatau, the area between the Chu and Talas rivers, as well as the upper and middle reaches of the Syr-Darya River. The pastural grazing areas could have passed along the path of ancient cities such as Koylyk, Dungene, Talgar, Almaty, Suyab, Taraz, Otyrar, Turkestan, Kulan, Merke, Sygnak, Balasagun, and Sauran. The Silk Way passed through some of these ancient cities.

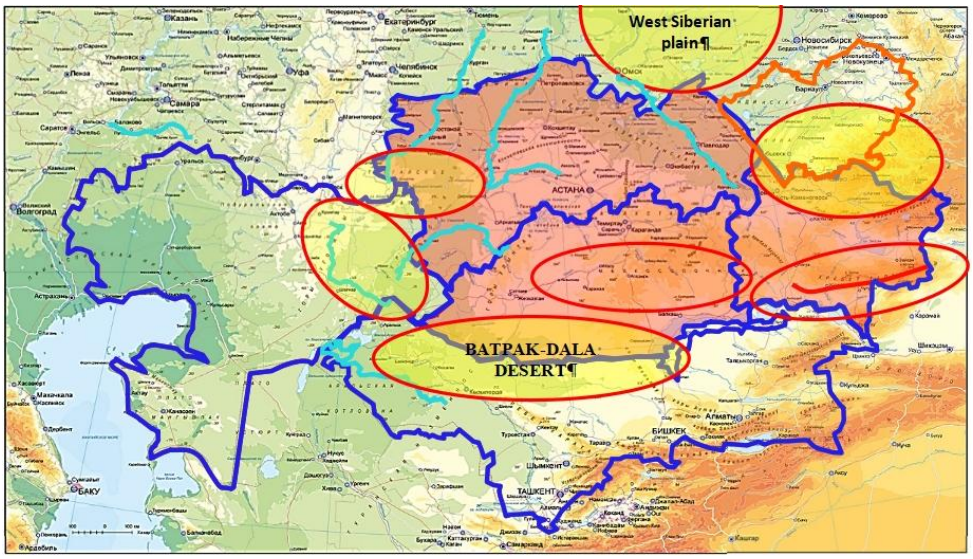

Figure 4. Map of the migration of the Middle Zhuz (tribal union). Compiled by the author per Masanov N.E. Includes the basins of the middle reaches of the Irtysh River, lower and middle reaches of Ishim, Turgai, and Tobol Rivers

Kazakhs of the Middle Zhuz grazed their livestock in the arid zones of deserts and semi-deserts, as well as the regions of the Prisyrdarya region. For meridional nomadism in the north of Kazakhstan, forest-steppe zones, foothill plains and lowland areas of mountains; and for vertical nomadism, they roamed in river valleys, areas near lakes. In meridional nomadism, the summer pastures were located in the steppe zone, where there was good precipitation. The low and high-altitude territories on alpine and subalpine meadows were better suited to the vertical nomadism of the Middle Zhuz (MKZ. T. I.-XII, etc.).

The time of the annexation of the Middle Zhuz to Russia is the middle of the XVIII century - the middle of the XIX century. Map 3 (developed by the author), shows the location of nomadic migrations of Kazakhs of the Middle Zhuz, where they may have passed nearby among ancient cities like Khakan, Egendibulak, Bakamyr, Yagnikent, Sygnak and other settlements.

During pastoral migrations, they covered the territories of Central, Middle and Eastern Kazakhstan, parts of the southern and middle reaches of the Syrdarya River, the areas from west to east of the Irgiz-Turgai-Tobol rivers to the Western Altai and Tarbagatai, from south to north of the middle reaches of the Syrdarya, puystini Betpak-Dala, parts of Balkhash, etc., see table 5 above. The territories of Western Kazakhstan belonged to the nomads of the Junior Zhuz. The borders from the Irgiz – Tobol – Turgai – Mugozhary river bands to the eastern end of the Caspian Sea and

the lower reaches of the Ural River in the latitudinal direction, etc. the exact description is described and shown in Table 5 and Map 4, (Masanov N. E. Nomadic civilization of the Kazakhs: the foundations of nomadic society. 1995).

Below are Table 6 and Map 3, compiled by the author, which indicate the territories of nomadic Kazakhs of the Middle Zhuz according to Masanov N.E. (Nomadic Civilization of the Kazakhs, 1995).

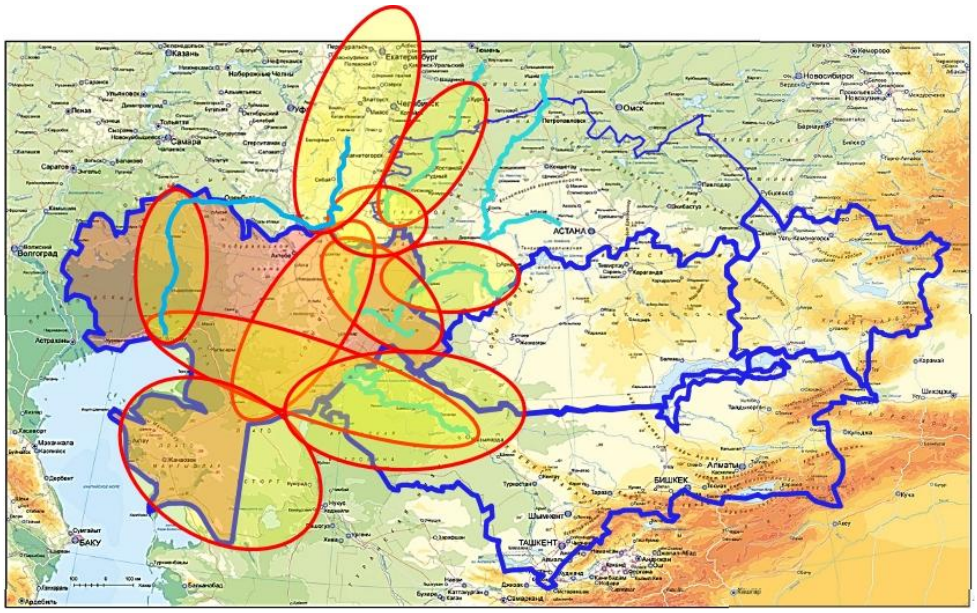

Figure 5. Map of the migration of the Junior Zhuz (tribal union). Compiled by the author per Masanov N.E.

Table 2. Territories of nomadism of three Kazakh Zhuzes (tribal unions), (compiled by the author per Masanov N.E., 1995)

Senior Zhuz
The Kazakhs of the Senior Zhuz traditionally occupied the territory of Jetysu (Semirechye), in particular the Ili River basin and its numerous tributaries, the foothills of the Dzungarian and Trans-Ili Alatau, the Kyrgyz ridge and Karatau, the interfluve of the Chu and Talas, as well as the areas of the upper and middle reaches of the Syrdarya. Winter pastures were located in the plains of the region in the sands, foothill and river valleys, and low-altitude areas with rugged terrain. Summer pastures in vertical nomadism were located in the mountainous and high-altitude areas of the Dzungarian Alatau and the western spurs of the Tien Shan, and in meridional nomadism along river valleys and lakes (MOT. Vol. II—IV, etc.). The approximate number of Kazakhs of the Senior Zhuz at the turn of the XIX—XX centuries was about 700 thousand. (see: HaverdovSt. Petersburg, 1803.; Spassky, 1820.; Tynyshpaev, 1925. and others). According to the folk genealogy (shezhire), the Kazakhs of the Senior Zhuz were divided into the following tribes: Zhalair, Oshakty, Dulat, Kangly, Sary-Uysun, Shaprashty, Shanyshkly, Ergeli, Ysty, Alban, and Suan. The place of Katagans, Bestamgalas, and a number of other groups in this structure is not entirely clear.
Middle Zhuz
The Kazakhs of the Middle Zhuz traditionally occupied the territory of Central, Northern and Eastern Kazakhstan, as well as partly Southern Kazakhstan along the middle course of the Syr-Darya. In latitudinal terms, the nomadic sites covered almost the entire area from the Irgiz—Turgai—Tobol watershed to Western Altai and Tarbagatai, and from south to north — from the middle reaches of the Syr-Darya, the Betpak-Dala desert and the northern tip of Lake Balkhash to the southern reaches of the West Siberian Plain, occupying almost the entire territory of the Turgai Plateau, Central Kazakhstan Hillrocks, river basins of the middle reaches of the Irtysh, lower and middle reaches of the Ishim, Turgai and Tobol, and reaching the Kulunda and Ishim steppes.
Junior Zhuz
The Kazakhs of the Junior Zhuz traditionally occupied the territory of the entire Western Kazakhstan from the Irgiz-Tobol-Turgay-Mugodzhary watershed to the eastern end of the Caspian Sea and the lower reaches of the Urals in the latitudinal direction and from the lower and middle reaches of the Syrdarya to the Urals and Tobol in the meridional direction, capturing a vast territory including the Mangyshlak Peninsula, the northern part of the Ustyurt Plateau, the eastern part of the Caspian Plain and the General Syrt Upland, the Emba and western part of the Turgay Plateau, the southern end of the Ural Mountains, the Mugodzhary, the northern part of the Turan Lowland and the northern coast of the Aral Sea. The winter pastures of the Kazakhs of the Junior Zhuz were mainly located in the desert and semi-desert zones, sands and river valleys, the coastal strip of the Aral Sea, the Syr-Darya, the Urals and their numerous tributaries and branches of rivers.

In winter, livestock grazed in desert and semi-desert areas, sands and river valleys, the coasts of the Aral Sea, Syr-Darya and Ural rivers, and their tributaries. Pastures concentrated in the summer were maintained in the steppe zone, in the valleys of the Turgay, Irgiz, and Tobol rivers, on the Emba and Turgay plateaus (Blaramberg, 1848; Meyer, 1865).

Map 4 shows the areas of nomadism of the Kazakhs of the Junior Zhuz, covering Western Kazakhstan and meridionally extending towards the river junctions of the Urals, Tobol, etc. The following ancient cities existed along the path of nomadic Kazakhs of the Junior Zhuz: Saraichik, Yagnikent, Jent, Urgani, Sygynak, which are shown on maps 5 and 6 below.

The nomadic way of life determined the low population density (0.5-2 people/sq. km) and multi-level organization. Three large associations were formed: the Senior, Middle and Junior Zhuzes, which occupied vast territories of modern Kazakhstan and adjacent regions.

The Senior Zhuz was located mainly in southeastern and southern Kazakhstan, part of central and northern Kazakhstan; the Middle Zhuz in Dzungaria, Western Siberia, and Central Asia; the Junior Zhuz in Western Kazakhstan, and part of it - in Southeastern Europe and the Urals.

The Great Silk Way passed through the territory of Kazakhstan, and the following fortified cities stood along its routes: Khakan, Imakia, Egendybulak, Koylyk, Talgar, Dungene, Suyab, Taraz, Merke, Kula, Almaty, Otyrar, Turkestan, Sygnak, Yagnikent, Jend, Saraishyk. These walled and guarded cities were centers of trade and crafts for the settled population, contrasting with the nomadic world outside, where nomads led difficult lives subordinated to the needs of nomadic pastoralism.

The dwellings of the nomads of Kazakhstan were functional and comfortable solutions that corresponded to the lifestyle associated with constant movement. The development of settlement and agriculture has led to the construction of more permanent homes. However, mobile traditions such as yurts continued to be preserved in the culture and are still a symbol of Kazakh nomadic culture.

Portable yurts and stationary sedentary stone houses reflect not only everyday life, but also the social, economic and climatic features of the era. Each dwelling was associated with the lifestyle of its owners and their interaction with nature. Studying these dwellings helps to better understand the culture and philosophy of nomads, as well as the role they played in the history of Central Asia.

Nomad dwellings – portable, stationary, settled, etc.

Nomad migration distances - meridional, vertical, latitudinal, etc.

Composition of **domestic animals** - sheep, goats, horses, camels, cows.

Economic occupation: mostly nomadic, semi–nomadic.

Type 1 - arid zone is arid deserts, semi-desert regions without natural reservoirs, with artificial sources of water (wells), and the organization of production had its own characteristics. In material production, there were minimal stationary encampments; there was no agriculture and fishing.

Water was extracted from underground soils using captage (bringing underground water to the surface).

Type 2 - nomads occupied mountain and foothill areas, forests, steppe zones with developed, natural surface reservoirs and summer precipitation, and did not build wells. The principle of the right of first seizure of water reservoirs was in effect. In winter, they spent 3-6 months in a stationary manner and ran a household, immovable dwellings prevailed - stone, wooden, turf, and adobe. They were engaged in agriculture, farming and fishing.

The 2nd type of nomads with natural water use, the practice of non-pastoral farms, high costs for labor and material reserves, and stationary dwellings predominated; they live a sedentary life in winter.

Table 3. Types of housing of nomads of Kazakhstan. Compiled by the author per Masanov N.E., 1995)

<table>
<tr><td colspan="3">I - PORTABLE DWELLINGS
The main type of dwelling of nomads of Kazakhstan in ancient and medieval times was portable structures that were mobile and easy to assemble/disassemble. This provided nomads with freedom of movement from pasture to pasture.</td></tr>
<tr><td>Yurt</td><td>Kos</td><td>Temporary field residential structures</td></tr>
<tr><td>Kiiz Ui (yurt) is a traditional portable dwelling of nomads, which is a symbol of the steppe world. It is a round structure with a frame made of wooden elements and a felt cover. The frame consists of vertical wall sections and a domed roof. It was easy to understand and collect, which allowed nomads to move from place to place.
Kiiz uy, kigez uy, kiez oy, terme uy, termya uy - various regional names.
The yurt frame consists of wooden lattices, which were installed in a circle. On them, they installed the dome poles and the dome ring.
- The felt cover protected against rain, wind and cold. The felt was made of sheep's wool, which provided good thermal insulation.
- The size and structure of the yurt varied depending on the social status of its owner. For poorer nomads, the yurts could be small, while the rich and noble had spacious and multi-room ones.
The yurt, thanks to its mobility and protection from harsh weather conditions, was used not only by the nomads of Kazakhstan but also by other nomadic peoples, for example, by the Mongols.</td><td>In summer time, the nomads moved 13-16 km per day. if stayed only for the night, the yurts were not raised, instead they put together "kos" (incompletely assembled yurts) from dome poles.</td><td>Smaller and simpler temporary dwellings were used in case of short travels. These could be light tent structures, covered with felt, and their variants. These dwellings were most often used in field conditions.</td></tr>
<tr><td colspan="3"><u>II - STATIONARY DWELLING</u>
In addition to portable dwellings, there were also more stable, stationary dwellings, especially in those cases when nomads settled on a certain territory for pastoral rest, or if the region had sufficient resources (grass, water). They were built especially in those places where they remained for a long time, or when natural resources were used (for example, rivers or oases).</td></tr>
<tr><td colspan="2">Brick or stone houses</td><td>Urban buildings</td></tr>
<tr><td colspan="2">Brick or stone houses were common in some settled areas of Kazakhstan. With the development of agriculture and settlements, nomads began to build more durable, weather-resistant dwellings. These houses were more stable and provided better protection from extreme weather conditions.</td><td>In the medieval period, with the development of trade and cities, for example, in such ancient cities as Taraz or Syghanak, nomads began to build more permanent dwellings, which no longer required constant movement. Materials such as stone, brick, and wood were used here. In such permanent settlements, it was possible to find houses with several rooms, courtyards and specialized premises for storing goods.</td></tr>
<tr><td colspan="3"><u>III - RESIDENTIAL DWELLINGS</u>
In the later period, when part of the nomadic tribes of Kazakhstan settled in one place, more settled forms of housing appeared. With the development of agriculture, economy, trade and permanent settlements, nomadic peoples began to build settled homes, cities and fortresses, some nomadic peoples began to transition to a more sedentary lifestyle. During this period, housing became more and more stationary.</td></tr>
<tr><td colspan="3">Features of construction and materials.
Building materials: wood was used for the frames of yurts and later houses. Leather, felt, fabric - a covering that creates thermal insulation. Stone and clay were used for the construction of stationary houses. Construction</td></tr>
</table>

technology: The lightness of the construction, as well as the ability to protect against cold, wind and rain were the most important principles of construction.		
Small residential houses	**Stone and brick houses**	**Urban dwellings in the Middle Ages**
Typical for many Kazakh settlements are **Auls**: villages, where small wooden or brick houses were built, with elements of national design and layout, corresponding to the traditions of the Kazakh people.	They were distributed in some settled areas of Kazakhstan. With the development of agriculture and settlements, nomads began to build more durable, weather-resistant dwellings. These houses were more stable and provided better protection from extreme weather conditions.	In the medieval period, with the development of trade and cities, for example, in such ancient cities as Taraz or Syghanak, nomads began to build more permanent dwellings, which no longer required constant movement. Materials such as stone, brick, and wood were used here. In such cities, it was possible to find houses with several rooms, courtyards and specialized premises for storing goods.

Nomadic architecture in winter: special fences (wind walls) made of wood, stone, reeds, brushwood, turf, and tents were built next to the wintering grounds, which were stretched vertically on poles, and yurts were erected. Newborn livestock and young animals were housed in wagons with people.

Movement in spring: As soon as the young animals got on their feet in a couple of days, it was necessary to cover 110-210 km in a short time, the routes of movement were common and spring pastures were quickly depleted by domestic animals. During the transition, nomads united in 2-4 Auls, and they covered 16-32 km per day, with short stops for 2-3 days, through 3-4 migrations.

Figure 6. Main Kazakh cities in the Middle Ages

Encampment along the way: Short stops - yurts were set up for 2-3 days, for short-term ones they put tents out of a yurt, they cover them with a koshma (cover material from felt), they make a number of shelters covered with felt out of a yurt, they spend the night there, they did not put up a yurt, because it took a lot of time. If it was hot during the day, they moved at night (Kuftin, 1926). Summer - (I. P. Shangin) - in the Nura region, 1000 yurts gathered for the summer. Other researchers encountered 30 auls, near Burul-Tokhoy, on the jailau over 400 auls, the auls were large with 500-1000 yurts - where the khans and sultans roamed the pastures. In summer, they roamed 13-16 km a day, stayed only for the night, did not set up a yurt, and made "kos" from uyks. Winter - Nomads who wintered in the sands, snowless places, grazing from well to well, around the main water source. When the Qystau (winter encampment) were located further in the sands,

their wintering tactics consisted of moving deep into the sands at the beginning until mid-winter, and by the end of the Qystau, after the snow cover had melted, back. They changed encampments every 15-25 days.

The Great Silk Way had a vast impact on the development of Kazakhstan, uniting East and West through trade, cultural exchange and the spread of technology. It stimulated the economic growth of the region, facilitated the exchange of experience and traditions between different peoples, as well as the development of cities, caravan-serais and infrastructure. The spread of religion and culture, as well as scientific exchange, reflected in architecture, agriculture, medicine, and science in Kazakhstan. Many cities on the routes of the Silk Way flourished and developed, some of them, such as Taraz, Almaty, Turkestan and Saraishyk were transformed into modern cities.UNESCO recognized the route of the Great Silk Way as a world heritage siteMaps 5 and 6 emphasize the existence and development of the ancient cities of Kazakhstan, which flourished during the nomadic civilization and were influenced by it due to the seasonal migrations of nomads.

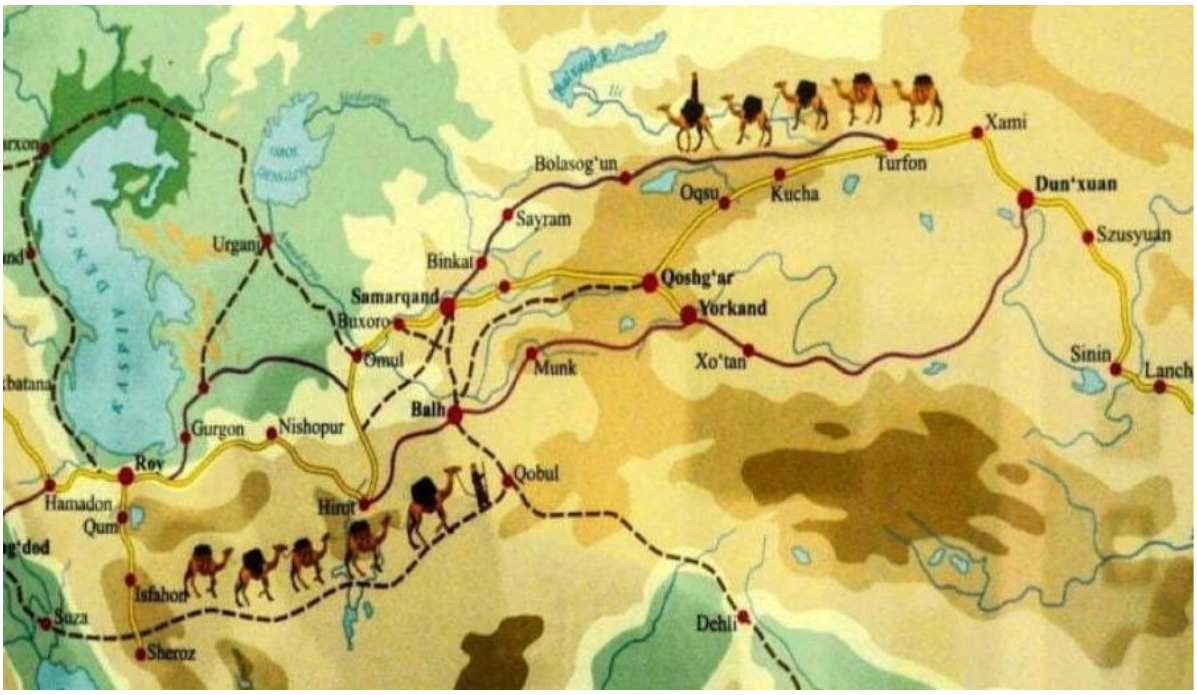

Figure 7. Silk way cities on the territory of Southern Kazakhstan
(https://orda.kz/vlijanie-velikogo-shelkovogo-puti-na-razvitie-kazahstana-383495/**)**

Findings/Discussion.

As shown above, the nomadic civilization of Kazakhstan have accumulated thousands years worth of know-how on survival in the arid and semi-arid regions of our nation. These technological, architectural, and biological inventions and accommodations deserve to be studied with practical purposes, as to how to possibly implement them in the near future to solve the imminent ecological problems that Kazakhstan faces.

The climatic conditions in the region are worsening: the multi-decade droughts and water shortages are inevitable in the following decades. Luckily, Kazakhstan has four thousand of years of lifestyle, designed specifically for such conditions, namely the nomadic pastoralism (nomadism).

Particularly, in Central Asia and Kazakhstan, the past nomadic knowledge of living in tight connection with nature can form the ideological, strategic, and technological paradigm for creating a sustainable economy in the arid climate. Namely, such emerging movements as Eco-Villages and Eco-Auls (mobile village for nomadic pastoralism).

These settlements, combining traditional know-how and the 21st century's technologies, could contribute greatly to food and resource security, providing for a natural way of soil regeneration and development of alternative energy sources (solar, wind, hydro, biochemical, geothermal, etc.) in the conditions of an extra-arid climate.

Development of Eco-Villages and Eco-Auls in the now vast empty areas of Kazakhstan is a great way to lessen the population and economic burden on the cities, create new occupations in education and healthcare services, and also create mobile nomadic technologies. The study of the nomadic civilization will allow the development of strategies for bringing back the nomadic way of life, transformed for modern conditions, in order to provide for a sustainable future.

The pastures of Kazakhstan have enormously suffered from agrarian experiments within the past 50-100 years, which led to regional-scale desertification. But it is still possible to revive and regenerate those lands through massive, large-scale nomadic pastoralism, as suggested by authors like Masanov, Savori, Akysh, Tuayakbaev, Baidaralin, and others. It restores topsoil, grass pasture diversity, water resources, climate, and provides oxygen as a byproduct.

The strategy developed by the author to maximally incorporate the heritage experience of the traditional nomadic lifestyle into modern concepts of development includes the following main principles and measures:

1. Conducting informational work on creating a positive image of Eco-Auls and their influence on the ecology and economy of arid zones of Kazakhstan.
2. Development of the necessary infrastructure for comfortable living in Eco-Auls and Eco-Villages.
3. Mass information campaigns about the advantages of nomadic animal pastoralism and Eco-Auls.
4. Creation of comfortable living conditions outside the city, including the Internet, remote education, mobile medicine, and ecological transport.
5. The development and introduction of affordable energy and water supply technologies.
6. Development of small and medium-sized businesses in the field of nomadic pastoralism in Eco-Auls, and perma-culture in Eco-Villages.
7. Development and implementation of infrastructure for eco-tourism.
8. Educational and research centers focused on the development of Eco-Auls and Eco-Villages.
9. Regular information campaigns in education, healthcare, economy, transport and science to strengthen positive trends, forming "eco-people" living in harmony with nature, like those of the past nomadic civilization of Kazakhstan, which will play an important role in the development of sustainable development not only in Kazakhstan, but also may become an example for many countries.

Conclusions

The author proves the relevance of studying nomadic architecture to solve the problems of climate change in Kazakhstan. The nomadic experience of Central Asia, living in symbiosis with nature, can become the basis for creating sustainable Eco-Villages and Eco-Auls. These settlements,

combining traditional knowledge and modern technologies, will ensure food and resource security, soil regeneration and the development of alternative energy in the conditions of an extra-arid climate. Eco-Auls are meant to decongest cities, provide new opportunities in education and health care, and also create mobile infrastructure. Research based on the study of the nomadic civilization of Kazakhs (N.E. Masanov and other authors) will allow the development of maps and tables for the revival of the nomadic way of life, adapted to modern conditions. The task of the generation is to ensure survival and prosperity in the conditions of droughts and water shortage, creating favorable conditions for the development of Eco-Villages and Eco-Auls in Kazakhstan. It is important to transfer knowledge and experience to the younger generation in order to ensure its sustainable future.

Regeneration of pastures of Kazakhstan, which suffered from agrarian experiments and desertification, is possible through large-scale nomadic farming, as suggested by authors like Masanov, Savori, Akysh, and Tuayakbaev. It restores soil, grass, water resources, and climate, and provides oxygen.The strategy being developed by the author to incorporate the experience of traditional nomadism into modern development is described above.

The contribution of the authors.

Asylgul Maksutovna Baydaralina – author and developer of the tables and three maps:
"Map of migration of the Kazakh nomads of the Senior Zhuz (tribal union)";
"Map of the migration of the Middle Zhuz (tribal union)";
"Map of the migration of the Junior Zhuz (tribal union)".

Daniyar Zhanatovich Baydaralin – assisted with the English translation of the article, developed the map *"Approximate geographic span of the Eurasian Steppe"*, and contributed to the development of the article's subject matter.

Gulnara Dzhuparbekovna Maulenova – responsible for the development of the article's structure and editing.

Bolat Uraikhanovich Kusspangaliyev – responsible for formulating the main concept and editing.

References

1. N. E. MASANOV, Nomadic civilization of the Kazakhs: funndamentals of Life of Nomadic Society (Socinvest, Almaty / Horizont, Moscow, 1995).- book
2. History of climate. Hydrometeoizdat, L., 1979.- Electronic journal
3. A.-S. Monin and Yu. A. Shishkov, History of Climate (Hydrometeoizdat, Leningrad, 1979).- book
4. I. Pershitz and A. M. Khazanov, "Community of Nomadic Pastoralists," NAA, No. 2, 51–60 (1979).- book

A. V. Shnitnikov, Variability of the General Moisture Content of the Continents of the Northern Hemisphere (Publishing House of the USSR Academy of Sciences, Moscow–Leningrad, 1957), p. 337.- book

5. L. N. Ilev, "The Historical Rhythm of the Nomadic Culture of Central Asia: Experience of Historical-Geographical Synthesis," NAA, No. 4 (1966).- book
6. E. Le Roy Ladurie, Histoire du Climat Depuis l'An Mil (Hydrometeoizdat, Leningrad, 1971), p. 280.- book
7. M. Kuri, "Regional Development and Problems of Desertification of Arid and Semi-Arid

Territories to the North and South of the Sahara," Nature and Resources, No. 1, 11–23 (1984).- book
8. F. Blaramberg, Military-Statistical Description of the Territory of Kyrgyz-Kaysakov Inner (Bukeev) and Zaural (Small) Hordes, Orenburg Region, in Military-Statistical Overview of the Russian Empire, Vol. XIV, Part I (St. Petersburg, 1848), pp. 30+119.- book
9. S. Monin, Popular History of Earth (Nauka, Moscow, 1980), p. 225.- book
10. E. V. Shneidstein, "Some Problems of Livestock Breeding in South-Eastern Europe in the Middle Ages," Vestnik Kalmytskogo NIYALI, Series: History, No. 9 (1974).- book
11. V. A. Shnirelman, "Ethnocultural Contacts and the Transition to a Productive Economy: On African and Asian Materials," Soviet Ethnography, No. 4, 26–39 (1982a).- book
12. V. A. Shnirelman, "The Late Primitive Community of Farmers, Cattle Breeders and Higher Hunters, Fishermen and Gatherers," in History of the Primitive Society: Epoch of the Primitive Family Community (Nauka, Moscow, 1986), pp. 236–426.- book
13. K. V. Kuksin and Z. I. Gordeeva, "Traditional Dwellings of Nomadic Peoples and Their Adaptation to Landscape Conditions (on the Example of Mongolian and Kazakh Lands)," Social-Ecological Technologies, No. 1–2 (2015).- electronic article
14. Kazakh Historical and Ethnographic Research (1995).- electronic book

B. B. Irmukhanov, History of Kazakhstan: Experience in Theory and Methodology (2004).- electronic book

15. T. A. Zhdanko, Materials for the Historical-Ethnographic Atlas of Central Asia and Kazakhstan (Publishing House of the USSR Academy of Sciences, 1961).- electronic book
16. M. Akish and M. Tuyakbaeva, Novye Nomady i Velikaya Step (2016).- book
17. Yu. V. Bromley and G. E. Markov, Ethnography (High School Publishers, Moscow, 1982), p. 284.- electronic book
18. Savory and M. Gorshenina, Permaculture and Holistic Management (2022).- electronic journal

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Еуразиялық көшпелі өркениетті ребрендингтеу: климаттың өзгеруі және қазақстан территорияларының аридизациясы жағдайындағы тарихи көшпенділік тәжірибесінің мәні.

Андатпа. Бұл мақала Қазақстанның көшпелі малшыларының мыңдаған жылдық “ноу-хауларын” біздің аймақтың қазіргі экологиялық жағдайлары мен себептеріне енгізу ойларымен таныстырады. Көшпелі мал шаруашылығының өмір салты Еуразия материгінің (Еуразия даласының) құрғақ және жартылай құрғақ аймақтары жағдайында тарихи түрде дамыды. Бұл өмір салты созылмалы маусымдық құрғақшылық пен су тапшылығымен күресу үшін әзірленді және жетілдірілді. Ол көп малды көшіруге, жылжымалы сәулет пен инфрақұрылымға, көшпелі технологияларға сүйенген. Қазіргі заманда, қалалар тіпті толып жатқан кезде, экономика мен азық-түлік қауіпсіздігі негізінен көбінесе егін

шаруашылығына сүйеніп жатқанда, кең құрғақ аумақтар пайдаланылмай қалып, адамзат үшін де, Жер планетасы үшін де нөлдік құндылық тудырады. Бұл шөлді жерлер бір кездері көшпелі мал шаруашықтың арқасындағы тұрақтылығының қозғалтқышы болғандықтан, гүлденген экологиялық жүйелер болган. Бірақ көшпелілік бұл аймақтардан жойылып, халық қалаға және егін шаруашылығына негізделген экономикаға көшкеннен кейін, олар жансыз шөлдерге айналды. 21-ғасырдың технологияларын, сәулет өнерін, инженериясын, жаңа энергия көздерін және материалдарын пайдалана отырып, бір кездері өміршең болған сол бос жатқан жерлерге көшпелі мал шаруашылығын қайта енгізіп, оларды қайтадан тірі экологиялық аймақтарға айналдыруға болады.

Түйін сөздер: экоауылдар, экоауылдар, киіз үй, көшпенділер, көшпелі мал шаруашылығы, құрғақ аймақтар, көшпелі сәулет.

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Ребрендинг евразийской кочевой цивилизации: значение опыта исторического кочевничества в контексте изменения климата и аридизации территорий казахстана.

Аннотация. В этой статье представлены идеи внедрения тысячелетних “ноу-хау” кочевых скотоводов Казахстана в современных экологических условиях и проблемах нашего региона. Кочевой образ жизни скотоводов исторически развивался в условиях засушливых и полузасушливых регионов Евразийского континента (Евразийская степь). Этот образ жизни был разработан и усовершенствован для борьбы с хроническими сезонными засухами и нехваткой воды. Он основывался на перемещении больших стад скота, мобильной архитектуре и инфраструктуре, а также кочевых технологиях. В современную эпоху, когда города перенаселены, а экономика и продовольственная безопасность в основном зависят от сельского хозяйства, обширные засушливые территории остаются неиспользованными, не принося никакой пользы ни человечеству, ни планете Земля. Эти пустоши когда-то были процветающей экологической системой, где кочевое скотоводство служило двигателем их устойчивости. Но как только кочевой образ жизни был искоренен из этих районов, а население переселено в городские районы с основанной на сельском хозяйстве экономикой, они деградировали в безжизненные пустыни. Используя технологии, архитектуру, инженерию, источники энергии и материалы XXI века, можно возродить некогда жизненно-важный кочевой образ жизни скотоводов на этих пустошах, вновь превратив их в кипящие жизнью экологические регионы.

Ключевые слова: экодеревни, экоаулы, юрта, кочевники, кочевое скотоводство, засушливые регионы, кочевая архитектура.

References:

1. N. E. MASANOV, Nomadic civilization of the Kazakhs: funndamentals of Life of Nomadic Society (Socinvest, Almaty / Horizont, Moscow, 1995).- book

2. History of climate. Hydrometeoizdat, L., 1979.- Electronic journal
3. A.-S. Monin and Yu. A. Shishkov, History of Climate (Hydrometeoizdat, Leningrad, 1979).- book
4. I. Pershitz and A. M. Khazanov, "Community of Nomadic Pastoralists," NAA, No. 2, 51–60 (1979).- book
A. V. Shnitnikov, Variability of the General Moisture Content of the Continents of the Northern Hemisphere (Publishing House of the USSR Academy of Sciences, Moscow–Leningrad, 1957), p. 337.- book
5. L. N. Ilev, "The Historical Rhythm of the Nomadic Culture of Central Asia: Experience of Historical-Geographical Synthesis," NAA, No. 4 (1966).- book
6. E. Le Roy Ladurie, Histoire du Climat Depuis l'An Mil (Hydrometeoizdat, Leningrad, 1971), p. 280.- book
7. M. Kuri, "Regional Development and Problems of Desertification of Arid and Semi-Arid Territories to the North and South of the Sahara," Nature and Resources, No. 1, 11–23 (1984).- book
8. F. Blaramberg, Military-Statistical Description of the Territory of Kyrgyz-Kaysakov Inner (Bukeev) and Zaural (Small) Hordes, Orenburg Region, in Military-Statistical Overview of the Russian Empire, Vol. XIV, Part I (St. Petersburg, 1848), pp. 30+119.- book
A. S. Monin, Popular History of Earth (Nauka, Moscow, 1980), p. 225.- book
9. E. V. Shneidstein, "Some Problems of Livestock Breeding in South-Eastern Europe in the Middle Ages," Vestnik Kalmytskogo NIYALI, Series: History, No. 9 (1974).- book
10. V. A. Shnirelman, "Ethnocultural Contacts and the Transition to a Productive Economy: On African and Asian Materials," Soviet Ethnography, No. 4, 26–39 (1982a).- book
11. V. A. Shnirelman, "The Late Primitive Community of Farmers, Cattle Breeders and Higher Hunters, Fishermen and Gatherers," in History of the Primitive Society: Epoch of the Primitive Family Community (Nauka, Moscow, 1986), pp. 236–426.- book
12. K. V. Kuksin and Z. I. Gordeeva, "Traditional Dwellings of Nomadic Peoples and Their Adaptation to Landscape Conditions (on the Example of Mongolian and Kazakh Lands)," Social-Ecological Technologies, No. 1–2 (2015).- electronic article
13. Kazakh Historical and Ethnographic Research (1995).- electronic book
14. B. Irmukhanov, History of Kazakhstan: Experience in Theory and Methodology (2004).- electronic book
15. T. A. Zhdanko, Materials for the Historical-Ethnographic Atlas of Central Asia and Kazakhstan (Publishing House of the USSR Academy of Sciences, 1961).- electronic book
16. M. Akish and M. Tuyakbaeva, Novye Nomady i Velikaya Step (2016).- book
17. Yu. V. Bromley and G. E. Markov, Ethnography (High School Publishers, Moscow, 1982), p. 284.- electronic book
18. Savory and M. Gorshenina, Permaculture and Holistic Management (2022).- electronic journal

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