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The Role of Geographical Factors in the Development of Plant-Based Industries in the Province of Kerman (7th–12th Centuries CE)

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ABSTRACT

The close relationship between history and geography has led geographical factors to play a significant role in historical events and developments. Therefore, examining geographical factors, particularly natural elements such as climate, vegetation cover, and water resources, contributes to a better understanding of historical issues and processes. The Province of Kerman has long been distinguished for its industries. During the era of the Kerman Seljuk Dynasty, in particular, industrial prosperity and growth intensified as a result of human factors such as strong political authority, territorial expansion, security, and commercial and economic policies and facilities. This study, while considering the interconnectedness of various economic aspects and modes of production, investigates the major geographical factors influencing the growth and development of plant-based industries in the Province of Kerman from the 7th to the 12th centuries CE. By examining the natural geography of the Province of Kerman and the most influential natural geographical factors, and through reliance on historical and geographical sources of the period using a descriptive-analytical approach, an attempt has been made to provide an appropriate explanation for this issue. The findings indicate that natural geographical factors, including climate and vegetation type, can influence agricultural patterns and the production of industrial crops within a region. Consequently, a region or city may experience the growth and development of industries associated with those particular plants.

Keywords: *Province of Kerman; Geographical Factors; Plant-Based Industries; Agriculture; Kerman Seljuks.*

Introduction

History and geography are deeply interconnected. Historical events occur within a geographical environment, and the geographical environment itself is filled with factors and phenomena that, while mutually related and mutually influential, also affect human and historical events either separately or in conjunction with one another. Within this geographical setting, human beings, as an agent, have also affected geography—or, more precisely, geographical factors and phenomena—in different periods and to varying degrees. In fact, it is this reciprocal relationship between human beings and the environment that has led to the formation of diverse political, economic, and social conditions throughout history. In examining this inevitable interaction between history and geography,



historical geography takes shape. However, there is no consensus among scholars regarding the definition and content of historical geography. Geographers regard it as a component of human geography, namely the study of the natural environment in relation to human life, whereas historians place it within the subfields of history and sometimes equate it with the local history of a place. One of the most appropriate definitions, which is also adopted in the present study, is as follows: historical geography is an interdisciplinary science composed of history and geography, whose aim is to examine the role of geographical factors and phenomena, especially natural geography, in the formation of historical events (1, 2).

One of the researchable and thought-provoking domains in historical geography is the study of the economy, including the industrial economy, of a geographical region. According to historical sources, the Province of Kerman has always held an important position in the industrial economy. Although, within the temporal scope of the present study, namely the seventh to twelfth centuries CE, the industries of the Province of Kerman experienced fluctuations for various reasons. The conquest of Iran in the seventh century CE, the period before the Arabs became established in Kerman and neighboring areas, and the political disorders arising from the transfer of Kerman among Iranian rulers and dynasties interrupted the growth of industries in this province. However, the stability created by the Āl-e Ilyās, the first local ruling house of Kerman, followed by the Buyid domination over Kerman, and finally the powerful rule of the Seljuks of Kerman, provided the ground for the development and advancement of various economic aspects of the Province of Kerman, including agriculture, trade, and industry. In particular, during the era of the Seljuks of Kerman, due to the stability and security established by the powerful rule of this period, the economy of the Province of Kerman, including its industrial economy, developed. In addition to expanding the territory of the Province of Kerman toward Makran and Hormozgan and extending it to the coasts of the Sea of Oman and the Persian Gulf, the Seljuk rulers of Kerman, through the special attention they paid to economic affairs, transformed the potential capacities and natural-geographical capabilities of the Province of Kerman into actual production and, by exploiting favorable geographical conditions, created the basis for the development of agriculture and agriculture-based industries.

In this study, in order to examine the role of geographical factors in the agriculture-based industrial economy of the Province of Kerman, an attempt is first made to obtain a relative understanding of the natural geography of the Province of Kerman and to classify the important geographical factors relevant to the objective of the study. Then, by relying on the selected sources, the study seeks to answer the following questions: during this time span, from the early Islamic centuries of Kerman's history to the fall of the Seljuks of Kerman, what were the major plant-based industries of the Province of Kerman? Which geographical areas produced these industries? What geographical and climatic characteristics were suitable for the cultivation and production of these industrial plants? Did the regions producing these industries possess the necessary geographical characteristics? More generally, what role did geographical factors play in the formation and growth of agriculture-based plant industries in the Province of Kerman?

Despite the numerous and valuable studies that have been conducted on the industries of the Province of Kerman, the role of geographical factors has often not been considered in them, or the studies have not dealt specifically and extensively with the plant-based industries of the historical period examined in this article. Bastani Parizi, in *The Valley of Haftvad*, while examining the geography of Kerman, addresses some agricultural issues as well as mineral industries and the weaving of shawls and carpets in the chapter on economic topics. However, these discussions relate to more recent centuries, and the plant-based industries of the early Islamic centuries of

Kerman's history are overlooked. In Ali Asghar Faqih's book *The Buyids*, a detailed account is provided of the industries of the Buyid period throughout the entire Buyid realm, without considering geographical issues. Adam Metz, in *Islamic Civilization*, devotes a chapter to the industries of the entire Islamic realm; as a result, the discussion of Kerman's industries is very brief and does not cover all centuries. Mohammad Khodavardi, in *The Political and Social History of Kerman from the Advent of Islam to the End of the Buyids*, and Mohsen Morsalpour, in *The History of the Seljuks of Kerman*, mention agricultural products and some major industries of Kerman in their economic discussions based on geographical books, but without offering a geographical analysis. In Mohammad Ali Golabzadeh's *The History of the Economy and Trade of Kerman from the Ninth Millennium BCE*, a general trajectory of Kerman's economy and trade is presented; however, because of the very broad chronological scope, some discussions are confined only to recent centuries, and the author's subject and purpose were not to examine geographical issues in the economy. In the article "Remarks on the Status of Productive Branches and Products in Iranian Cities during the Seljuk Period" by Shahram Yousefifar, the productive branches of textile production and metalworking are classified. Likewise, in the article "A Study of the Textile Industry of Iran in the Tenth and Eleventh Centuries CE" by Jahanbakhsh Thavaqeb and Mitra Roshani, the textile industry of Iran in the tenth and eleventh centuries CE is examined, and Kerman's textile industry is briefly described, but the role of geographical factors in the flourishing of this industry is not analyzed.

Geographical Factors and the Natural Geography of Kerman Province

Geographers generally classify geographical factors, sometimes referred to as environmental capacities, meaning the capabilities and potentials of the geographical environment, as follows: landforms, weather and climate, water resources, soil, vegetation cover, and animal biological resources (3, 4). Climate and vegetation cover are two geographical factors that influence agriculture and, consequently, agriculture-based industries; these two factors are therefore examined more closely in this study.

Climate: climate and climatic conditions such as temperature, precipitation, and air humidity are among the most fundamental geographical components that directly and indirectly influence different domains of historical events, particularly the economic and livelihood conditions of various historical periods (1, 4).

Vegetation cover: natural vegetation cover includes forests and rangelands, shrublands, and the plants of highland and desert regions. Various factors, such as climate, soil type, and landforms, affect the vegetation cover of every region (4).

The Climate of Kerman Province

Because Kerman Province is located at the intersection of the high central mountain ranges and low-lying desert and arid areas, there is a considerable difference in altitude across different regions. This has resulted in climatic diversity in the province, which falls into three climatic zones. The first is desert and semi-desert climate: a long hot period during the year, low precipitation, and severe and continuous winds are among the climatic characteristics of these areas. This type of climate occupies the largest area of the province. The Lut Desert, the Jazmurian depression, the Sirjan salt flat, the Rafsanjan-Anar plain, Ravar, Bam, Kahnuj, Manujan, Qaleh Ganj, and Arzuiyeh have this type of climate. The second is the climate of foothill regions: this type of climate has developed in the foothill areas of the province. In these areas, due to higher altitude and proximity to the mountains, climatic conditions are more favorable. The foothill areas of Baft, Rabor, Kuhbanan, Bardsir, and Jiroft have this type of

climate. The third is the climate of mountainous regions: these areas are characterized by high altitude, abundant precipitation, mostly in the form of snow, short summers, and low temperatures, such as Lalehzar, Rabor, Bahr Aseman, Sarduiyeh, and other similar areas (5, 6).

The Vegetation Cover of Kerman Province

The vegetation cover of Kerman Province is influenced by climate, landforms, soil type, and water resources. In general, the province's vegetation cover can be classified into three regions: first, the vegetation cover of cold regions, or mountain forests, which mostly includes the highlands of Jiroft, namely Jabal Barez, Delfard, and Bahr Aseman, as well as Bam, including Deh Bakri, and Baft, including Khabr; second, the vegetation cover of tropical regions, including the warm southern regions of the province such as Faryab, Kahnuj, Anbarabad, Jiroft, Rudbar, Rigan, Manujan, and Qaleh Ganj; and third, the vegetation cover of dry regions, which mostly includes areas with annual precipitation of less than 150 millimeters. Due to low rainfall and high evaporation, these areas have relatively weak and sparse vegetation cover. These regions include Kerman, Sirjan, Rafsanjan, Bam, Narmashir, Fahraj, and parts of Shahr-e Babak, Ravar, Bardsir, Zarand, Anar, Rayen, Golbaf, and Shahdad (5, 6).

Historical Divisions of the Province of Kerman

In geographical books written within the Islamic realm, the Province of Kerman is divided into five *khūrahs* or districts. *Khūrah* is a Middle Persian term, one of whose meanings is "land" or "city and its surrounding district." In Islamic geographical texts, it also appears as *kūrah*, and careful attention to its usage shows that *khūrah* was a unit smaller than a province or *eyālat* (7). This division in the Province of Kerman did not have a geographical basis, since cities with very different climatic conditions were grouped under one district. The five *khūrahs* of this vast province were the *khūrah* of Bardsir, the *khūrah* of Narmasir or Narmashir, the *khūrah* of Sirjan, the *khūrah* of Bam, and the *khūrah* of Jiroft.

The *khūrah* of Bardsir, corresponding to present-day Kerman County, was the northern *khūrah* of the province and contained many towns. Mahan, Kūghan or Gūghar, Zarand, Janzrud or Chatroud, Kuh-Biyan or Kuhbanan, Qavāf or Bafq, Unās, part of Rafsanjan, Zāvar or Ravar, Khunab or Tehrud, Ghubayra around Sirch, Kāreshtān, whose location is unknown, and Khabis or Shahdad, along with the small towns of Nashk, around eastern Keshit and now unidentified, Keshid or Keshit, Kuk or Golbaf, and Kathrava or Anduhjerd, were the towns of this *khūrah*. The eastern *khūrah*, adjacent to Sistan, was Narmasir, with four towns: Bahir, located between Rigan and Bam, west of Fahraj; Kark; Rigan; and Nesa. The western *khūrah* of the Province of Kerman was Sirjan, which included Bimand, Shamat, east of Sirjan, Vajeb or Baft, Barzuk or Arzuiyeh, Khur, whose location is unknown, and Dasht-e Barin or the Arzuiyeh plain. The *khūrah* of Bam was another eastern *khūrah* of the Province of Kerman, and five towns are mentioned within its territory: Darzhin or Darzin, Tushtan, whose location is unknown, Avarek or Abarq, Mehrgerd, near Abarq and now unidentified, and Rayen. The southernmost part of the Province of Kerman was the *khūrah* of Jiroft, which was nearly comparable to the *khūrah* of Bardsir in the number of its towns. Eleven towns were located in this district: Bas; Jakin, near Bas and now unidentified; Manuqan or Manujan; Darhfan, unidentified; Juy-e Soleyman, around Mount Soleyman; Kuh-e Barjan, west of Sardū; Qohestan-e Abu Ghanem or Qohestan; Mughun, south of Kahnuj and Faryab; Javaun or Jowaran; Wolashgerd or Golashgerd; Rudkan, unidentified; and Darfani or Darqan, namely Delfard (8). Apart from the regions of present-day Kerman Province, the coasts of the

Persian Gulf, Old Hormuz, south of present-day Minab, the coasts of the Sea of Oman, and Makran were also, for much of the period examined in the present study, generally included within the territory of the Province of Kerman.

The Weaving and Textile Industry

During this period in the history of the Province of Kerman, one of Kerman's important and fundamental industries was the weaving and textile industry. Textile production is one of the oldest industries created by humankind, and it developed in different periods and in specific places for numerous reasons. The art and industry of textile production in the Province of Kerman has an ancient background, and archaeological findings in the ancient regions of the Province of Kerman confirm this. For example, in Shahdad, from the third millennium BCE, the weaving industry can be traced in the form of fine and coarse fabrics woven from plant and animal fibers (9). Sources from the Islamic period also frequently report this industry in the Province of Kerman, to the extent that the textile and weaving industries of Kerman constituted one of the major export pillars of this province and enjoyed high quality and excellence in international markets. A prominent example is the description of Bam's weaving industry in the sources of this period. Yaqut al-Hamawi describes the people of Bam as skilled and masterful in weaving (10). Other sources also praised this industry in Bam and referred to the excellent and superior cotton and silk fabrics of Bam that were exported to many regions. Clothing produced in Bam was known by the name of Bam in the most distant places and was in high demand, especially in royal courts and for luxurious royal garments (8, 11, 12).

Apart from the role of political and governmental factors in establishing stability and security, especially during the Seljuk period, as well as in revitalizing trade and the trade routes of the Province of Kerman and improving various economic aspects, other issues, such as the examination of the natural-geographical factors of each region, are also researchable in relation to the growth and flourishing of industries, including the weaving industry in the Province of Kerman.

In this period, the agriculture-based weaving industry and the industrial plants related to it were founded on cotton, silk, and flax fibers. Woolen fibers fall under the category of animal fibers. Given the abundance of reports on cotton and silk weaving in the Province of Kerman, the following discussion examines textile production based on these two plant-related fibers. Cotton has always been one of the most important and principal plants producing natural fibers. Although different species of this plant are compatible with the climatic and soil conditions of various regions of Iran, it is generally a heat-loving plant that requires relatively intense and clear light for growth and must never be exposed to frost or severe cold during its growth period. It is also resistant to soil salinity, and its water requirement is moderate (13).

According to historical and geographical sources, Shahr-e Babak, Bam, and Zarand were three centers of cotton cultivation as well as producers of excellent cotton fabrics that were exported to distant regions and enjoyed international fame (11, 14). These three regions were located entirely within the dry and warm regions of the geographical setting of the Province of Kerman. These areas possessed sufficient light and heat and all the geographical requirements necessary for the growth and production of cotton.

Five centuries after the chronological scope of this study, Vaziri still noted that Kerman's textile industry remained prosperous (15). Cotton cultivation still persisted in most warm regions of Kerman Province. Bam, Narmashir, Rigan, Sirjan, Rafsanjan, Ravar, Davaran, and Zarand were major centers of cotton production in that period (15). Among them, the weaving of Zarand, as in previous centuries, remained distinguished. The coarse cotton cloth produced from Zarand cotton and the famous Zarand linings, which were also known by the name of this region, continued

from the time of Ibn Hawqal to the time when Vaziri's geography was written (11, 15). Bam was also one of the important centers producing cotton fabrics; within its own geography, cotton was both cultivated and processed in workshops producing cotton textiles (11).

Another fiber mentioned in the texts of this period is silk. Silk is one of the oldest known animal fibers, and although it is classified as an animal fiber, it is based on the mulberry tree and is therefore connected to the agricultural sphere. Sericulture, or the industry of raising silkworms for silk production, is possible alongside the cultivation of mulberry trees and mulberry orchards, because the mulberry tree is the only food source of the silkworm. In tropical to temperate regions, the silkworm can grow and be raised during the warm seasons of the year, namely spring and summer, and any change in temperature or cold conditions reduces production in this field. The mulberry tree, although hardy and capable of growing in most soils, is best suited to tropical and subtropical climates and requires low to moderate irrigation (16-18).

By examining and comparing the major centers of silk and silk-fabric production alongside mulberry orchards in the sources of this period, it becomes clear that these centers were geographically located in warm, dry, and semi-dry regions; that is, areas whose geographical conditions were fully compatible with the growth and cultivation of mulberry trees and the silk industry. Bam was the most important and principal center of silk and silk-fabric production in the Province of Kerman. Silk fabrics known in international markets as Bami fabrics were renowned for their quality and excellence and were exported everywhere. Bam's weaving industry was not limited merely to the production of silk fabrics. The production of silk clothing, including turbans, kerchiefs, *taylasāns*, *tirāz* garments, and other items, especially for the rulers of the time, indicates a broad chain of occupations related to, intermediary to, and dependent on the textile industry in this region. This chain is described through the artistic, skilled, craft-oriented, cloth-dealing, and weaving people of the region. The growth of this industry and the silk-producing character of this region were due to the existence of numerous mulberry orchards in Bam (7, 8, 10-12). Rayen, one of the five main towns of the *khūrah* of Bam, was another center of silk and silk-fabric production under the name of Bami fabrics. It also had numerous mulberry orchards and operated in this field under the influence of Bam (8).

Rigan and Khabis were two other regions on the margin of the Lut Desert with dry and semi-dry geography. According to the sources of that period, they had many mulberry orchards and were silk-producing areas (8, 12). However, these two towns were not themselves weaving centers, and it is likely that their silk was transported to the weaving workshops of Bam or Rayen in the eastern half of the Province of Kerman, where it was turned into fabric and clothing. In the western half of the Province of Kerman, Sirjan was also one of the major centers of silk weaving (8). Sirjan is located on the edge of a salt flat and desert and has a dry, warm climate with abundant heat, compatible with the growth of the mulberry tree and the cultivation of silk.

The natural geography of Kerman required that, because of the limitations of winter agriculture, attention be directed toward industries that required fewer resources but more time, delicacy, and labor, while also producing significant economic returns. Such industries included silk weaving, the weaving of fine fabrics, and some delicate metal handicrafts (19). The silk industry was also dependent on cheap and abundant labor and required a large population that perhaps had more limited opportunities in other industries and economic fields (16). Given these conditions, the relationship between the geographical limitations of the dry and warm regions of the Province of Kerman and the silk industry is clearly visible. Geographical conditions in these regions did not allow every type of crop to grow for agriculture; rather, the crop that grew and was cultivated was one that, in addition to being

compatible with the climate of the region, provided a suitable and profitable industrial and economic field of activity for the inhabitants of that region.

Some linguists, in tracing the etymology of the word Kerman, refer to one of the strongest arguments as follows: linguistically, Kerman is composed of two words, *kar*, meaning “to weave,” and *mān*, meaning “land”; taken together, Kerman means “the land of weaving.” They have identified numerous derivatives from the root *kar*, preserving the same meaning of weaving, in Persian and Iranian dialects, especially within the territory of Kerman. These include *kārgāh* in early Persian, meaning a place of weaving; *karbās*, a cloth woven from thick cotton thread; *kerm*, from the root *kar*, meaning a weaver and spinner of thread, of which the silkworm is a prominent example; *kermān*, a type of cross-shaped weaving spindle; *qālī*, through the phonetic substitution of *k* and *r* with *q* and *l*; and *gelīm*, through the substitution of *k* and *r* with *g* and *l*, meaning something woven or a covering (20). This derivation of Kerman as the land of weaving is consistent, on the one hand, with Kerman’s weaving industry and its geography as a setting for the growth and flourishing of this industry, and, on the other hand, with the myths associated with Kerman.

The myth of the Worm of Haftvad was first narrated in Ferdowsi’s *Shahnameh* and later in other sources as well (21, 22). This ancient Iranian myth, which deals with the naming of Kerman, the events surrounding the conquest of Kerman by Ardashir Babakan, and the foundation of the Sasanian state, is filled with points connected to the weaving industry and its antiquity and prosperity in the Province of Kerman. Elements such as weaving women and girls, spinning spindles, and a worm that becomes the source of the fortune and victory of the ruler of this region all demonstrate the connection between the weaving industry, especially the silk industry, and the Province of Kerman, particularly Bam. Many researchers believe that the spatial and geographical evidence of this myth is related to Bam and the areas under its control and adjacent to it, rather than to other cities of the Province of Kerman (23, 24). As examined earlier, the eastern half of the Province of Kerman, centered on Bam, was one of the centers and poles of the silk industry, and because of the favorable geographical factors for the growth of this industry, it gained considerable fame in this field.

It is also important here to address the secondary branches of the Silk Road in Kerman and their possible connection with the silk industry of this province. Because silk was the most famous and most valuable commodity transported along this route for centuries, this name was given to it in the nineteenth century CE (25). There were also other branches and secondary routes, as well as a maritime Silk Road, associated with this network. Whenever the famous overland route of the Silk Road faced difficulties, or when southern Iran was more secure than northern Iran, this maritime route and the southern branch of the Silk Road became more active. The maritime Silk Road connected the coasts of the Persian Gulf, including the port of Hormuz, to Jiroft and Kerman and then to the interior regions of Iran. The southern branch of the Silk Road connected Kerman through Bam to Makran, the port of Tis, and the Sea of Oman. Bam was also situated on the route to Sistan and Afghanistan and on the route to Qohestan and Khorasan. In southern Iran, the most important entrepôt of this route was the coasts of the Persian Gulf and the Sea of Oman. Within the chronological scope of this study, this route was particularly active at the beginning of the Islamic period; likewise, during the era of the Seljuks of Kerman, because of the special attention that the rulers of this dynasty paid to trade and because of the security and authority they established in their territory, the two important ports of Tis and Hormuz on this maritime route were highly frequented. Since one of the most important commodities transported along this route was silk, regions situated on this road that also possessed appropriate geographical and climatic conditions for the development of the silk industry grew in this field. Bam, for example,

became so capable in this industry that it gained international fame. Bastani Parizi also believes that acquaintance with Chinese silk probably reached Bam through this very route (23).

The Dyeing Industry

Within the weaving industry, there was also a set of related and dependent industries, one of the most important of which was dyeing. The art and industry of traditional dyeing was based on dye-producing or dye-yielding plants, and in this respect it was linked to nature and natural geography. Some of these cases are discussed below. One of the oldest and most important plants in dyeing was indigo, which had long held great significance in the dyeing industry because of its color stability and its strong ability to combine with a wide spectrum of natural colors (26). Indigo is a biennial shrub cultivated in early spring or autumn, depending on the climate of the region. The appropriate climate for its cultivation is warm and humid; therefore, it is mostly cultivated in tropical regions (27). In the sources of this historical period, a vast area from the border of Mughun and Wolashgerd to the Hormuz region in the south of the Province of Kerman is mentioned as an indigo cultivation zone (11). More specifically, Jiroft and Narmashir were two important centers for indigo cultivation and harvesting (8). Southern Kerman Province, as a warm region with extensive plains, including Jiroft and the regions to its south, possesses a foothill climate, rich soil, and abundant water, making it the best agricultural area. Narmashir also has a dry and warm climate. Therefore, the regions mentioned in the sources were geographically among the most suitable areas for indigo cultivation.

In addition to the wide extent of indigo cultivation in the Province of Kerman, the harvest time of this product in different regions is also significant. Muqaddasi notes that indigo was harvested in Narmashir in spring and in Jiroft in other seasons (8). This was also influenced by the favorable climate of the Jiroft region for agriculture, which allowed cultivation and exploitation of agricultural products in autumn and winter. Therefore, the Province of Kerman possessed the necessary conditions for cultivating and producing indigo for dyeing throughout all months of the year.

The sources do not mention dyeing workshops in the Province of Kerman. However, given the extensive cultivation of indigo in the Province of Kerman and the broad prosperity of weaving in Kerman, indigo was undoubtedly transported from major indigo-cultivation areas, especially Narmashir and Jiroft, to Kerman's weaving centers, including Bam, Rayen, and Zarand, where dyeing workshops existed alongside weaving workshops. An examination of the geographical distribution of weaving workshops and indigo cultivation, as well as the distance between them and the modes of transportation of that period, also confirms this point.

Indigo was bought and sold not only within the internal territory of the Province of Kerman but also with other regions outside the province. The sources indicate that indigo from the region of Mughun and Wolashgerd to Hormuz was transported to other regions, and that the indigo of Narmashir was exported to Khorasan (8, 11). Indigo was a plant native to Iran, and the blue dye obtained from it was a principal color of Asian civilizations, remaining unknown in the West for a long time. Dyeing with indigo to obtain blue was much easier and more durable than dyeing with woad, another dye-producing plant yielding blue shades; therefore, indigo quickly replaced woad and spread to other countries. In Iran, the main areas of indigo cultivation were Sistan and Baluchestan and Kerman, and modern studies have shown that fresh indigo leaves dried in the climate of Kerman contain more indigo and dyeing power than those of other regions. Indigo refers to the blue dye derived from the indigo plant, obtained in the final stage of dyeing from indigo (27). The natural-geographical characteristics of Kerman provided suitable

conditions for indigo cultivation; this high-quality indigo not only met the needs of the internal weaving industry but was also exported through trade to other regions. According to Samani, the Niliyan were a class of people who were in some way involved in matters related to indigo, whether dyeing or buying and selling it. The Sabghiyan were also makers of dyes who were present in some cities, and there are signs of their connection with Kermani merchants who bought and sold indigo in markets associated with Kermanis (28, 29). Sometimes, the production of a color with a specific shade was also identified with a particular geographical region (27). Given these descriptions, the blue color derived from indigo may perhaps be attributed to Kerman and Sistan and Baluchestan.

The cultivation and export of other dye-producing plants, especially in later centuries, continued in the Province of Kerman. Madder and henna are two dye-producing plants that grow better in desert and warm geographical environments, and the warmer the environment in which they grow, the greater their dyeing power. The best regions for the growth of these plants are southern and southeastern Iran, including Sistan and Baluchestan, Kerman, and Yazd (30, 31). The major centers of madder cultivation and production in the Province of Kerman were Rafsanjan, Anar, and Zarand (15). The mentioned areas are regions with warm and dry climates, especially Rafsanjan and Anar, which are located beside the plain of the Anar-Rafsanjan desert region. Therefore, they possessed fully suitable conditions for the growth of madder. Kerman, Shahdad, Narmashir, and Jiroft were among the major centers of henna cultivation and export (15), and they had suitable geographical environments for henna cultivation. Henna was cultivated especially in southern and southeastern Iran, namely Sistan and Baluchestan and Kerman, where warm areas are suitable for cultivating high-quality henna. Among these, the henna of Shahdad has high quality and strong dyeing power, to the extent that it is known as “fiery henna” (31).

The geographical conditions of the Province of Kerman are so suitable for the growth of some dye-producing plants that, in addition to being cultivated extensively, these plants also grow wild beside streams or in suitable plains, as they did in the past (32). The exploitation of these wild dye-producing plants was mostly carried out by nomadic pastoralists. Nomads used these plants for dyeing their woven products, which were made from animal fibers. Especially during the Seljuk period, dyeing was prosperous among nomads (27, 30).

The Industry of Date Syrup and Syrup-Making

Dūshāb, also called *kuāb* or *kūshāb*, refers to date syrup that has been boiled and thickened. In addition to dates, the term has also been used for grape, apple, and mulberry syrups (33, 34). In this study, *dūshāb* refers to date syrup.

Dates were among the most important agricultural and commercial products in the Province of Kerman. In addition to being exported to other regions and provinces, they were closely connected with the livelihood of the inhabitants of the Province of Kerman. During that period, date syrup, or *dūshāb*, in addition to its medicinal properties and high nutritional value, had great importance and use as an inexpensive sweetener. It was cheaper and more accessible to the public than the other sweeteners of that time, namely *panīdh*, or sugar, and its production was also easier.

The growth of the date palm is possible in regions with mild winters and hot, dry summers, and there should be no rain or excessive humidity during the five to seven months between pollination and harvest (35). The date palm is resistant to soil salinity, to the extent that it is considered a restorative plant: its cultivation helps correct soil salinity and remove salt from the soil, preparing the land for the cultivation of other crops in subsequent years (36).

Therefore, the date palm is a tropical tree resistant to drought and water scarcity, capable of growing in hot and dry areas and even in desert and arid regions.

In the geographical texts of this period, dates and even date syrup are mentioned as among the important products in the general description of the Province of Kerman (8, 37). A more precise examination of the date-producing areas of the Province of Kerman according to the historical and geographical texts of this period leads us to two major date-cultivation regions whose geographical conditions fully correspond to the requirements for establishing palm groves. The first was the eastern region of the Province of Kerman, especially the towns of Bam, Rigan, Narmashir, and Khabis, all of which were located near the Lut Desert and were low-water areas with very low humidity and long, hot, dry summers. In the texts of this period, Bam and Rigan are described as areas with abundant palm groves (8, 11, 37, 38). Narmashir, in addition to cultivating date palms, was also a warehouse for collecting dates from the provinces of Kerman and exporting them to Sistan and Khorasan (8). Khabis was another important center of date production (8, 10, 12). Khabis was a city on the edge of the Lut Desert and had very low humidity. The quality of its dates remains renowned today, and the dates produced in this region are distinctive and unique. The word *khabis*, the Arabicized form of *habich*, is associated with dates in older texts and means dates mixed with oil, which recalls the significance of dates in this region (15).

The second date-producing region of the Province of Kerman was Jiroft and its warm districts, including Mughun, Wolashgerd, Kumin, corresponding to present-day Kumiz village between Jiroft and Bandar Abbas, Bahrukan, corresponding to present-day Barnaku village around southern Jiroft, Manuqan, and Qohestan-e Abu Ghanem southward to Hormuz (8, 11, 37, 38). These were considered the warm regions of the Province of Jiroft, had many palm groves, and were geographically areas with warm, semi-desert climates and high temperatures, possessing the necessary conditions for date production.

Hormuz at this time was a port on the coast of the Persian Gulf south of present-day Minab. After the Mongol invasion and the resulting insecurity, it was transferred to the present island of Hormuz. According to the sources of this period, the port of Hormuz was the commercial port of Kerman and the anchorage of ships from India and Sindh on the coast of the Persian Gulf, and it was included within the Province of Kerman (38). This coastal point had a hot and humid climate and favorable conditions for producing tropical crops such as dates and sugarcane. Even later, when the island of Hormuz replaced it, the inhabitants of the island of Hormuz returned to this coastal point in summer to obtain provisions and agricultural products. In fact, coastal Hormuz continued to supply the agricultural and livestock products of the new Hormuz (39). Mughun and the region of Moghestan, mentioned in ancient sources, included the area south of Kahnuj and Minab up to the sea coast, and some researchers believe that Hormuz was a city within the Moghestan region. The important point here is the meaning of the word Moghestan. Moghestan is composed of two words: *mogh*, meaning palm, and *-estan*, meaning land; thus, Moghestan means palm grove or land of palms. Even today, the people of this region call the palm *mogh* in their local language, and this area was called Moghestan because of its extensive palm groves (39). The existence of extensive palm groves and the date-producing character of this region were also influenced by its geographical and climatic conditions.

Therefore, first, given the abundance of palm groves in the Province of Kerman and the low price of dates in this province (11), and second, considering the importance and position of date syrup in the diet of the people of that period, as noted earlier, the industry of date-syrup production and *dūshāb*-making workshops must undoubtedly have been highly prosperous in the Province of Kerman.

The Industry of Sugar and *Panīdh*

Panīdh or *fānīdh* referred to red or white sugar or sugar candy. In addition to its medical uses, it was an important sweetener prepared from sugarcane juice (40). The industry of sugar and sugar-candy production was one of the earliest large-scale human activities and also had a thousand-year history in Iran. Iranians were among the first peoples who were able to prepare crystallized white sugar by using stone mills and making changes to sugarcane juice, and to offer it in the world markets of that time (41, 42).

Sugarcane is one of the two major sugar-producing plants and, until the mid-eighteenth century CE, when sugar from sugar beet was produced, it held the monopoly in sugar production (43). This industrial plant grows mainly in tropical regions, and light and heat are highly important for its growth and quality, because it requires abundant light energy to produce sugar and is among the strongest plants in converting light energy into sugar. Although it requires sufficient water and humidity, it is resistant to drought, and the only limiting factor for its growth is cold (41, 44).

According to the sources of this period, the Province of Kerman and the two regions of Makran and Hormuz were among the principal centers of sugarcane cultivation and *panīdh* production. Within the territory of the Province of Kerman, sugarcane and *panīdh* were produced abundantly in Sirjan, Jiroft, and the warm regions south of Jiroft, from the vicinity of Mughun and Wolashgerd to the Hormuz region (8, 11, 37, 38, 45).

Jiroft and the southern regions of Kerman Province can be described in terms of landforms, climate, and water and soil resources as follows: the Jabal Barez Mountains are located to the east, between Jiroft and Bam, while the Sarduiyeh and Bahr Aseman Mountains are located to the west. Between these two mountain ranges, scattered plains cover 70 percent of the region. Because of water and alluvial soils flowing down from the mountains, the plains of this region have fertile soil and abundant water (46). Jiroft and the southern regions of Kerman Province are located in the Halil River basin. The Halil River, the most important river of Kerman Province, with a length of 400 kilometers, originates in the northwestern highlands of Kerman Province and, after passing through Jiroft, Kahnuj, and Anbarabad, enters Rudbar and flows into the Jazmurian marsh. Climatically, these regions are divided into two general categories: first, relatively cold and cool mountainous areas, including the mountainous areas of Sarduiyeh, Delfard, Bahr Aseman, and Jabal Barez; and second, the hot and scorching areas of Jiroft, Kahnuj, Manujan, Anbarabad, and Rudbar (6). Given these descriptions, among the geographical factors of Jiroft and the southern regions of the Province of Kerman, the warm foothill plains of this region possessed the necessary and suitable geographical conditions for sugarcane cultivation. The plains of Jiroft, Kahnuj, Manujan, Rudbar, and Faryab were fully suitable for sugarcane cultivation in terms of light, high temperature, and water and soil resources, and the sources of this period also mention them as regions of sugarcane cultivation and *panīdh* production.

Makran and Hormuz, in most centuries of this period, especially during the era of the Seljuks of Kerman, were located within the Province of Kerman and were considered part of this province. Both regions lay within the sugarcane-producing belt of that time and, according to the sources, were regarded as mines of sugar and *panīdh*. Makran in particular was highly renowned for sugarcane cultivation and *panīdh* production, and the sugar and sugar candy produced there were exported not only for internal consumption but also to neighboring lands such as Khorasan and Sistan, or through the port of Tis to more distant regions (12). More precisely, Jadran or Kharzan, Maskan, Kiz, Kushk, Qand or Qasr-e Qand, Beh, Band, Dark or Dezak, Isfaqueh, and Qasdar are among the towns mentioned in the sources as areas of sugarcane cultivation and *panīdh* production (8, 37, 38). Although most historical and geographical sources describe Makran as a hot, dry, and barren land, as one moves away from the

inland and desert areas and approaches the coasts and highlands of this region, climatic conditions change significantly. The coastal areas of the Sea of Oman, with their hot and humid climate, and the highlands, with milder and cooler weather, provide conditions for cultivation and agriculture. Likewise, the presence of the Mehran or Sindh River in eastern Makran and the Bampur River within Makran supplied the necessary water resources for agriculture in this region (47).

According to the sources of this period, one of the important areas of sugarcane cultivation and *panīdh* production was Khash or Khwash. This region, located in Makran, was considered part of the territory of Kerman, and all sources mention this town under the Province of Kerman as one of the centers of sugarcane production, exporting *panīdh* to Sistan and Khorasan. It is reported that the houses of its inhabitants were made of reeds, which may be related to sugarcane (11, 38). Khash is located on the slopes of Mount Taftan; however, because of its proximity to the equator and the Lut Desert, it does not have a mountainous climate, but rather a warm and dry climate suitable for sugarcane cultivation (47).

Conclusion

Given the importance of a geographical perspective in analyzing historical events, the present study, through an examination of historical and geographical texts, reached the following conclusion: in addition to human factors, geographical factors, especially natural geography, including climate, which encompasses temperature, humidity, and precipitation, and the type of vegetation cover, which is itself dependent on other factors, play a significant role in historical events. Climate and vegetation type influence the kind of agricultural activity in a region, and the vegetation cover and agriculture created within a geographical environment also affect the agriculture-based industrial economy of that environment. During most of the seventh to twelfth centuries CE, especially in the era of the Seljuks of Kerman, the Province of Kerman experienced considerable prosperity in industries based on agriculture and plants. The particular type of industry that flourished in each geographical region was related to the agriculture and vegetation cover of that region, which was itself strongly dependent on geographical factors, especially the region's climate. The production of silk and cotton fibers, and consequently the textile industry, flourished markedly in the regions of Zarand, Bam, Davaran, Rayen, and Sirjan, and one of the major reasons for this was the favorable geographical conditions of these regions for the growth of the industrial plants cotton and mulberry. In connection with the weaving industry of the Province of Kerman, the dyeing industry also flourished, owing to the cultivation of indigo and, at a later stage, henna and madder in the warm southern regions of the Province of Kerman, which were suitable areas for the cultivation and production of indigo, henna, and madder. The development of the date-syrup industry in the date-producing regions of Bam, Rigan, Narmashir, Shahdad, Jiroft, and Hormuz was likewise due to the compatibility of the geography of these regions with the growth of date palms and the formation of extensive palm groves. In addition, during the Seljuk period, the Province of Kerman and its connected regions, namely Makran and Hormuz, engaged in extensive production and export of *panīdh*. One important reason for the prosperity of the *panīdh* industry in the Province of Kerman was the widespread cultivation of sugarcane in the province and its warm regions, which possessed the necessary conditions of abundant light, heat, humidity, and sufficient water.

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Authors' Contributions

All authors equally contributed to this study.

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The authors of this article declared no conflict of interest.

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Transparency of Data

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