



## Investigating the Role of Livestock Products Production in the Spatial Organization of Houses in the Historical Village of Liqvan, Iran<sup>1</sup>

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### Abstract

**Purpose-** This research attempts to analyze the role of livestock production in the spatial organization of the houses in Liqvan village that is one of the famous rural areas at the national level in Iran, and it owes most of its fame to the dairy products produced there (especially cheese).

**Design/methodology/approach-** This study has been carried out in two sections: library and field studies. The theoretical part is done from available and accessible library resources (including books, magazines, articles, and authoritative sites). The field part is done using the "phenomenology" method.

**Findings-** Studies show that in the traditional livelihood period, the role of livelihood was influential in the formation and spatial composition of the houses in this village, and the old living spaces of Liqvan were shaped to respond to the functions, with appropriate internal divisions, to provide long-term living facilities. However, along with the contemporary wave of modernization and changes in the needs of the present era, and especially the significant shift in income from traditional activities to mass dairy production, in the newly built houses, the residential spaces have often been converted into living spaces that do not have much affinity with local customs and traditions and do not have compatibility with the native architecture.

**Original/Value-** Given the significant changes in the livelihoods of rural communities, it is crucial to implement strategies for developing and regenerating villages like Liqvan. This includes stabilizing rural centers, creating production and promoting income centers, and revising development strategies and policies. The focus should be on leveraging local potentials. The study also advocates introducing new productions and reviving past activities and services through production clusters with technical and specialized consultations. Furthermore, the preservation of indigenous architecture and the regeneration of local spaces can contribute to the growth of the tourism industry in the village.

**Keywords:** Animal production, Livestock production, Spatial organization, Housing, Liqvan village, Iran.

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## 1. Introduction

The life of the villages depends on the economy and production, and livelihood has played an essential role in the formation and spatial composition of the village houses. Human settlements have grown and expanded generally based on agriculture, animal husbandry, and related activities following changes in the nomadic lifestyle. The economy and the production system reflect the function of these living centers and are an essential factor influencing the texture, body, and shape of residential buildings. According to Rapoport (2013, 60), economic factors play a significant role in the structure of living complexes. The role of the economy and its degree of influence on various aspects of the building and residential space<sup>i</sup> have been discussed throughout history. Although multiple factors are influential in the emergence of a phenomenon, and sometimes the role of one factor is more prominent than others to the point of being determinative, the economic factor is one of them.

This article delves into the intricate relationship between the production system and the spatial organization of the renowned village of Liqavan, a suburb of Tabriz. Liqavan, a terraced village, holds national fame in Iran for its productive and livelihood-oriented nature. Its economy, primarily driven by dairy products (especially cheese), was officially recognized in 2020 (with No. 2311) as one of Iran's intangible works (Ministry of Cultural Heritage, Tourism and Handicrafts of Iran, 2020). The village's economic landscape is further shaped by agricultural products (wheat, barley, chickpea, etc.) and handicrafts (kilim<sup>ii</sup>, Jajim<sup>iii</sup>, woolen clothing, basketry, etc.), all of which contribute significantly to the villagers' income sources.

Prior to contemporary developments, the village's structure was primarily centered on local production and livelihood. Dairy production, livestock maintenance, and food preparation all took place within the limited space of the houses, and sometimes the courtyards were also used as enclosures. However, in the past half-century, with

the prosperity of production and the prominence of the Liqvan cheese brand, as well as the emergence of technology and the consequent creation of new needs, the architectural form of the residences has undergone a fascinating transformation. This transformation is evident in both the residential spaces and the livelihoods of the villagers.

Today, the transformation of most houses into residential spaces in an urban style, and the presence of stables on the ground floor of some others, is a significant shift. The workshops and factories surrounding the village, now used for dairy production, and the relatively large enclosures in the middle of the land for livestock keeping, have led to a unique spatial organization for the village. This transformation, especially in terms of housing, is a direct response to new demands, making it a crucial area of study.

Previously, the interior spaces of the village dwellings were primarily small and rectangular, consisting of an oven, a weaving room, rooms for various purposes such as guest reception, sitting, sleeping, work, and carpet weaving, as well as storage and a kitchen. The enclosures were either located on the ground floor of the residential level or in a corner of the courtyard. The primary construction materials were plaster, lime, bricks, and clay, with trim and few windows to counteract the cold weather. However, contemporary dwellings are built in multi-story structures similar to urban houses, equipped with spaces such as reception areas, bedrooms, sitting rooms, kitchens, and storage, and equipped with water and electricity systems. The enclosures are located on the ground floor or utilize makeshift sheds in the heart of the mountains.

Following the emergence of the Islamic Revolution in Iran (1978-1979 A.D.) and the rapid urbanization, the architectural features of Liqvan village, like many other villages in the country, underwent fundamental changes. This study aims to identify and ultimately explain the relationship between livelihood activities, particularly economic activities (mass production surplus), and the spatial organization of Liqvan village.

<sup>i</sup> . In this study, the residential space means spaces where work activities such as animal husbandry, production of products, weaving, etc., are carried out. In living spaces, living activities of villagers, such as eating, sleeping, etc., are formed.

<sup>ii</sup> . A kilim is a flat tapestry-woven carpet or rug traditionally produced in Iran.

<sup>iii</sup> . Jajim also spelled as gelimsis is a handmade, flat-woven textile made of colored natural fiber which is created and used in the majority of villages and rural areas of Iran (Hall, 1996).

Specifically, the analysis of the spatial organization of residences before and after the 2000 A.D. aims to optimize the use of existing facilities and capabilities, strengthen sustainable development, and outline the development prospects of Liqvan village.

Conclutionly, this research aims to answer the following questions: How is the relationship between livestock product production (dairy, meat, and wool) and the spatial-physical organization of houses in Leigu Papa Village (over time)?

## 2. Research Theoretical Literature

### 2.1. Production

Production means creating things along predetermined paths and through specific methods within a framework of particular and defined relationships among all those directly involved in the production process and those who enable the work of the direct producers, usually called indirect producers. In production, humans enter into relationships with nature and each other through a specific form of cooperation and mutual exchange of their activities. They enter into certain "production relations" with one another to produce, and it is only within these social relations and relationships that their relationship with nature and production takes shape (Ahmadi, 2002). In all societies, productive labor occupies the central part of most people's lives and is always situated within the broader economic system (Giddens, 2008).

Space, as the medium of production and processing, assumes a pivotal role in the process of value addition. As Madanipour (2016) asserts, the significance of space in the economy can be dissected in two ways: space that is shaped and altered in response to economic demands, and space that is in itself a valuable commodity.

In the first concept, space may be approached as a medium for social and economic activities. As new places are developed, old places are transformed to accommodate diverse functions. In the second concept, space is a social process, and its production and exchange can occur within the market process.

The first concept has a direct relationship between production and use. In the second meaning, the emphasis is more on the relationships between production and exchange. In the first concept, urban development is a response to a need. In the second meaning, it is considered a need and a

driver of economic activities, whether to maximize profits, circulate capital, or create employment.

Thus, the intricate interplay between space production and its interdependence with other sectors of the urban and national economy becomes apparent. The creation of the artificial environment, given its magnitude and significance, harbors internal dynamism and substantial capacities that spur those involved to seek avenues to harness production capacities and financial gains.

### 2.2. Spatial organization

Spatial organization means 1-the general pattern of the use of space by a community and 2. The way the components of space are arranged about each other makes their interaction and complementary relationship possible (Saeedi & Hosseini-Hasel, 2009). It is the order among the roles of the elements that introduce the artificial environment as a system. This system consists of a set of semi-independent components, the elements of which, in a purposeful order, transform the set into a unified whole (Mansouri, 2007). Just as every system and structure is composed of components, spatial organization has its components and elements. Bill Erickson (2002) considers the spatial organization a set of physical and functional elements and components that form the spatial configuration and arrangement. In architecture, as mentioned above, we need a conceptual cut from the individual cases towards a general view to create a good set. Different options show us ways to organize the components. The primary components can be arranged to become more than the primary components; they can create spaces, patterns, themes, and outdoor spaces (D.K. Ching, 2007). As it is evident, although spatial organization is a term that has been used with different meanings and despite the similarities in its definition, it has yet to find a single concept. Still, it is a compound series of a backbone and an interconnected network of diverse and diverse uses and elements that give coherence to the whole. Its warp and woof extend throughout its entire extent.

### 2.3. Rural Housing

Traditionally, the spatial arrangement of rural settlements has been conceptualized as a town-centered, centralized pattern, where the town serves as the core and the villages form its periphery. However, with the advancements in rural transportation infrastructure and the ongoing

process of urbanization, the choices made by rural residents regarding their places of residence and employment have become increasingly diverse. These changing preferences have acted as a catalyst for the spatial redistribution of residential and occupational functions, prompting a reorganization of the traditional spatial patterns that define towns and villages (Liu et al., 2025)

Housing is a physical facility unit, an economic and durable good, an element with a social or collective role, a set of services, and also an economic category that is part of the fixed capital stock, a means of wealth production, and a tool for governments to regulate economic growth (Bourne, 1981). In this regard, economic factors, architectural style, the local language of the region, cognitive approaches, climate, geography, and local customs and traditions all influence the development and design of housing in different locations (Sendich, 2006). The function of housing and providing shelter is to create favorable conditions for realizing family activities. Rural housing has undergone extensive changes in recent years as a material and cultural element. In addition to its residential role, this cultural element is also part of the space for employment, production, and storage of life necessities (Hedayat-Nejad, 1996).

Villagers, in tune with the nature of the village and their social, economic, cultural, and geographical environments, have a unique internal organization and physicality. This is evident in the type of residence and the various ways of livelihood and life (Philo, 1992). The architectural structures of rural environments are a significant outcome of human activity, evolving over centuries in harmony with social, cultural, and environmental conditions. The morphology and spatial patterns of rural architecture have gradually been shaped to meet the sociocultural needs of the residents and in interaction with the surrounding physical environment. This perspective, particularly in the bilateral relationship between the natural environment and its historical context, defines the human-made environment as a vessel of meaning. Humans are naturally drawn to settle in an environment they can connect with on a meaningful level, in an environment they can connect with meaningfully (Norberg-Schultz, 1985).

Housing, as a spatial manifestation of human ideals, ideas, and functions, is significantly

influenced by economic-social deterrents and physical barriers. One of the key approaches that shape housing construction is the environmental approach. This approach underscores the role of natural environmental factors in limiting or controlling human activities, particularly the use of cultural resources and social organization (Shakuei, 2010).

The climate factor directly affects the constituent elements of geographical environments, such that it is influential in the formation of different types of soil, vegetation cover, and water flows, as well as the construction of some natural landforms like relief forms and coastlines. Accordingly, those who study human geography from this perspective widely accept and emphasize the dominant and deterministic role of weather, as well as the climatic conditions and raw materials available in the location, in the emergence of human settlements. 1. The socio-cultural approach that considers human culture as the determining factor in human activities and the geographical features of places are considered as a reflection of cultural bases. According to anthropological and sociological studies, various factors such as inventions, discoveries, innovations, population growth, ecological changes, wars, and cultural contacts are involved in cultural changes. These changes have also strongly influenced the physical fabric of rural and urban housing, transforming it quickly (Ibid,180). 2. both material and non-material cultures are changing and transforming with the passage of time; according to this transformation, they find a new order. According to anthropological and sociological studies, various factors such as inventions, discoveries, innovations, population increase, ecological developments, wars, and the contact of cultures are involved in cultural changes. These changes have also greatly affected the physical structure of rural and urban housing and have transformed it quickly (Amanollahi, 1983). 3. The economic approach of housing is a basic need for households, considered an economic commodity. In the past, housing was considered an individual asset and economically non-productive. The economy plays a decisive role in forming traditional and indigenous settlements in the economic approach. This factor is mainly related to how wealth is produced and distributed, the distribution of products, and its relationship with the physical construction of rural housing.

Therefore, with the increase in surplus production, part of the capital becomes wealth and is used for welfare. Its effects appear definitively and decisively on the overall shape of the house, which is one of the most apparent human symbols. Among the economic factors, the type of livelihood and the pattern of exploitation of the natural environment, along with the income of rural households, have been able to influence the shape and use of rural housing effectively (Taghavi, 2020).

It is crucial to recognize that housing, a key determinant of quality of life, is not just a physical structure but a reflection of the rural community's needs and aspirations. The architecture of residential units and other activity spaces in rural areas and the building materials are influenced by the local environmental conditions and the rural community's awareness and preferences. The rural community's familiarity with new architectural patterns in cities and the spread of interests based on the urban living culture in rural areas takes the rural architectural pattern out of its Indigenous form (Musavi and Salehi, 2005).

The advent of modern technology, changes in the production structure, social and economic indicators, and cultural indicators have not just influenced but revolutionized the pattern of rural housing (Moradi, 2015). The occupation of the villagers has also had a significant impact on the formation and organization of rural architecture, so that the functional elements and components of rural housing are different from agricultural and livestock activities, etc.; for example, in the central regions of the southern Caspian Sea, the agricultural economy in rural housing requires space for storing agricultural products such as rice and agricultural tools and equipment such as tillers, etc. For example, the "kandooj", which is a wooden cubicle with dimensions of three by four square meters and a height of two meters, was used by rice growers in the northern provinces of the country for the storage and preservation of rice stalks (Mahdinezhad et al., 2017).

The reason for the change in the structure and function of rural housing, the function and role of housing related to the livelihood and economic activity of the family, has been lost, and it no longer responds to the needs of the rural community. In addition, the cost of building housing was meager in the past. Although the village supplied its

architectural design and materials, rural housing was well suited to the needs of the villagers and their type of activity (Musavi and Salehi, 2005). However, it should also be noted that economic factors not only affect the quality of construction and the materials used but also determine the spatial organization and the type of spaces required. Therefore, the village's economic factors regarding the town's physical space can be discussed in three groups: 1. Type of production activity or activities (type of products: immediate sale after harvest, storage of the product and related spaces) 2. Means of production (traditional, semi-mechanized, fully mechanized, and associated spaces) 3. The income level with the power of investment in the housing sector (Zargar, 2007). Rural households mostly use nature's environmental facilities and materials for housing construction, but recently, many changes and transformations have occurred in rural housing. Following the relative improvement in the economic situation of families due to the increase in agricultural product prices and the acquisition of non-agricultural incomes, gradual renovation began in the village, and many rural families made changes in their residential units. While traditional rural dwellings are designed to accommodate a production-based lifestyle, the production necessities in newest dwellings in this village have become less prominent. They still need to create spaces for storing agricultural tools and equipment or have unique spaces for preparing local products. Therefore, the foundation of these activities is weakened. They either have to progress from within or gradually be eliminated from daily life (Mohammadzadeh et al., 2017). In the following, some of the research backgrounds are mentioned.

- Jahansoozi et al (2024), in an article titled "Modeling the Impacts and Consequences of Climate Change on Sustainable Livelihood of Rural Communities (Case study: Rural Households in Mashhad County)" has examined the effects of climate change on the livelihood sustainability of rural residents in Mashhad County<sup>iv</sup>. The research method is descriptive-analytical. The results indicate that climate change impacts the financial, social, human, natural, and physical capitals of local communities. The most significant effects include income reduction, increased costs, rising product prices, decreased

- productivity and employment, reduced sense of place, increased dependence on government support, lower health standards and quality of life, strain on land resources, occurrence of hazards, and a decline in public services and facilities.
- [Torabi Farsani et al \(2023\)](#), in an article titled "Future Research for Promoting Tea Tourism in Rural Areas of Gilan Province, Iran" using structural analysis shows that Guilan Province, which is located in the north of Iran, has great potential (tea hotels, tea museum, tea landscapes, etc.) for promoting tea tourism, and this niche tourism can be a strategy for preserving intangible and tangible tea heritage. This shows that the quality of rural life can be improved by relying on the manufactured products and promoting ecotourism. As the most compatible tourism type, ecotourism has drawn attention more than other forms of tourism for rural development in recent years. Since some villages have no or very weak potential for the development of ecotourism, it is imperative to select villages for this purpose consciously. The prioritization of villages for the development of rural tourism is even more important when considering the constraints on financial resources ([Imani and Alavi, 2022](#)).
  - [Taghavi et al \(2020\)](#), titled "The Impact of Economic Change on Livelihood Spaces (Agriculture and Animal Husbandry); Qazvin Rural Housing", examines the architecture of rural housing, livelihoods, and the impact of economic changes on housing. The aim of this study is to investigate modern developments in the formation of spaces related to rural residents' livelihoods and the influence of economic transformations on the elements of rural housing architecture. Responding to the question of why there is a morphological and spatial transformation in rural housing, influenced by economic changes in rural communities, is one of the key challenges of this research. The method used is descriptive-analytical. The results indicate that economic developments have primarily led to improvements in living spaces and increased local facilities and amenities for villagers, while the production spaces related to livelihoods within rural housing have received little attention.
  - Next is the study by [Rezaei and Haghparast \(2020\)](#) titled "lifestyle on the spatial organization of houses in the historical-tourist village of Kandovan, in East Azerbaijan province". This study, with a strong focus on the human element, examined three houses: traditional Karans (residential quarters), contemporary Karans, and newly constructed houses. The research method was descriptive-analytical and conducted at the library and field study levels. The results, which underscore the role of the residents, showed that the architecture and spatial design of the residential units were strongly influenced by the activities and livelihoods carried out within them. The residents' lifestyle and occupational activities, a testament to their adaptability, played a significant role in shaping the residential spaces in Kandovan village. The study concludes that the spatial organization of houses in Kandovan was closely tied to the residents' way of life and livelihood practices, whether traditional or evolving with societal changes.
  - The study by [Mohammadzadeh and Rezaei \(2019\)](#) aimed to analyze the residential parts (Karan<sup>y</sup>) of the historical village of Kandovan village, focusing on their production-livelihood approach. The research method used was qualitative, with a phenomenological approach. Data was collected through library studies and field research, including open-ended and in-depth interviews, to understand the hidden reasons behind the phenomenon being studied. The results showed that the residential and historical spaces in Kandovan were shaped to serve various functions. However, with the changes and emergence of new livelihoods such as tourism, the production-livelihood spaces of the Karans have moved away from their previous functions and have transformed into simpler residential spaces. The study concludes that the traditional residential quarters (Karans) in Kandovan village were initially designed to accommodate the production-livelihood needs of the residents but have since adapted to newer economic and

social changes, particularly the rise of tourism.

- [Zaheri et al \(2018\)](#) examined the changes in the pattern of rural housing. They evaluated its economic impacts in the two districts of Aji Chay and Meydan Chay in Tabriz County. The research method was descriptive-analytical and correlational. The results of the research show that there is a strong and significant relationship between the factors of social changes and the pattern of rural housing, and economic factors; also, in the spatial distribution, there is a direct and relatively complete correlation between social changes and the pattern of housing in the ten villages. Architectural plan indicators, housing construction quality, and housing resistance directly impact economic factors.
- [Shams al-Dini et al \(2011\)](#), in an article titled "The Impact of Rural Housing Renovation on the Livelihood Economy of Villagers: A Case Study of the Central District of Mamasani County," examined the impact of rural housing renovation on the economic system of the villages in the central district of Mamasani County. The research method was analytical-descriptive and survey-based. The results show that housing renovation has improved the physical space while preserving the beauty and resistance of the village. Regarding the livelihood economy, the incompatibility of the layout of some houses with the type of productive activity (livestock farming) has caused most villagers to refrain from carrying out their activities. Therefore, the renovation of homes, in addition to the relative comfort of the villagers regarding safety and beauty, has caused a subtle change in their livelihood and financial conditions.

This article aims to examine the role of production and activity behavior in the architecture and spatial organization of village houses in detail that has not been addressed in depth in previous research.

### 3. Research Methodology

#### 3.1 Geographical Scope of the Research

Liqvan village is 36 kilometers southeast of Tabriz, on one of the slopes of Sahand Mountain, and in the neighborhood of Sefideh-Khan, Beiraq, and Hervi villages. The location of communication routes, the natural state of the settlement, and the presence of services have made it proposed as the center of the complex in the upstream plan (Tabriz urban complex plan). The height of this village is 2150 meters above sea level, and the formation of the village on the hills facing the sun - in a stepped way - goes back to the early Islamic period. The products of this village can be divided into four categories: agricultural products (walnuts, apples, barley, wheat, etc.), local foods, and handicrafts (carpets, woolen clothes, etc.). Finally, dairy products, including (cheese, milk, butter, curd, yogurt, etc.) knew that in the economic field, more than 100 dairy factories have expanded, and along with it, employment, self-sufficiency, and economic prosperity. As a result, it has led to the continuation of settlement and the prevention of migration. In addition to that, this village has natural landscapes and historical monuments, including a historical cemetery and stone lions (except for the registered national monuments belonging to the 7th century AH), the stone palace of Haj Ehtsham al-Dawlah, the stone bridge of Haj Salar, a historical bath and Qiz Qalasi (the Castle of Girl) belongs to the Qajar<sup>vi</sup> period. It attracts many tourists to this village every year. Also, Kaleh Qandi and Karans (Nagimlir) houses are other historical attractions in this village ([figure 1](#)).

<sup>iv</sup>. It is worth noting that this study emphasizes the role of livelihood (which in this village is based on agriculture, livestock, and horticulture) in shaping the rural landscape and enhancing the economic resilience of villagers for rural fabric revival.

<sup>v</sup>. Rural houses of rock architecture type (conical or sugarcane shaped)

<sup>vi</sup>. Qājār dynasty, the ruling dynasty of Iran from 1794 to 1925 A.D

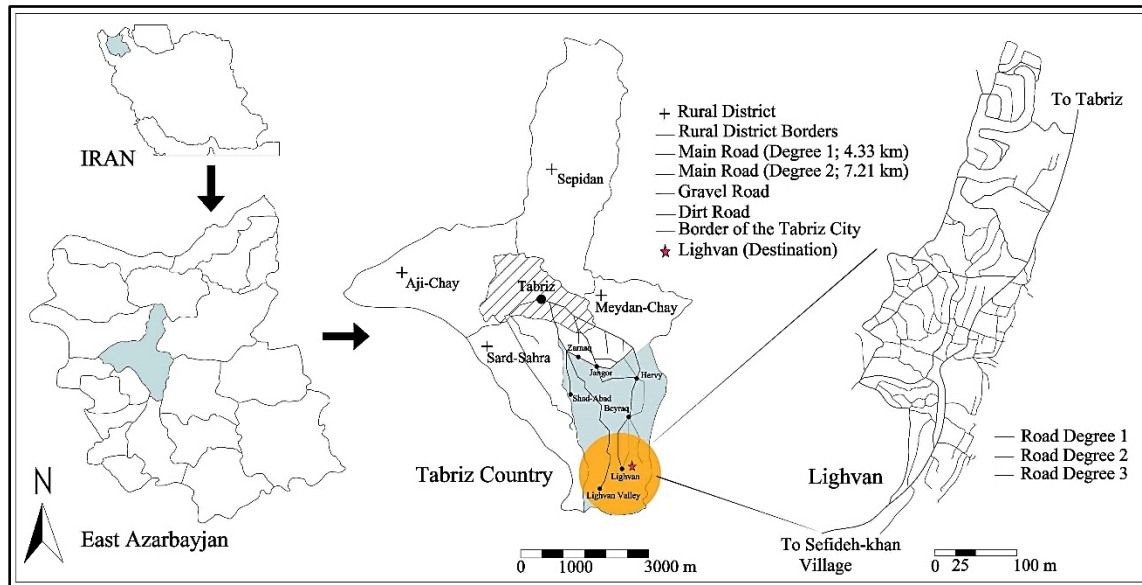


Figure 1. location of Liqvan Village

### 3.2. Methodology

This study has been carried out in two sections: library and field studies. The theoretical part is done from available and accessible library resources (including books, magazines, articles, and authoritative sites). In the interview section, in-depth and semi-structured interviews are used. To determine the content validity of the questions (in the interview), consultations were conducted with five faculty members from the Departments of Geography and Urban Planning, Architecture, and other experts in the research field (faculty members from Tabriz University and Islamic Art University of Tabriz). After obtaining their approval, the extracted objectives shaped the content of the questions. Additionally, part of the questions is created during the conversation. Statistical population, older and more experienced activists in the field of animal husbandry and dairy production were interviewed until saturation. Therefore, the participation of 10 people, from villagers aged 45-90 years old, benefited, each lasting between 30 and 45 minutes. To assess the reliability, interviews were conducted in Liqvan village on two occasions by the authors. These interviews have been

recorded so that, through repeated review of the conversations, a more accurate analysis and examination of the participants' viewpoints can be conducted. At this stage, the data are considered raw and unprocessed, representing the initial phase of the research. The results obtained from this section are coded, and the data are classified into concepts and objectives.

### 4. Research Findings

In general, from the point of view of the participants in the interview, livelihood, and economy can be examined both inside and outside the houses:

#### 4.1. Outside the houses

The focus of attention in this village has been and still is dairy matters. In this regard, there are many spaces, one for keeping livestock (slum-pen-karan) and another for producing and processing livestock products. Figure 2 shows the position of livestock spaces, and each one is explained below (Figure. 2).



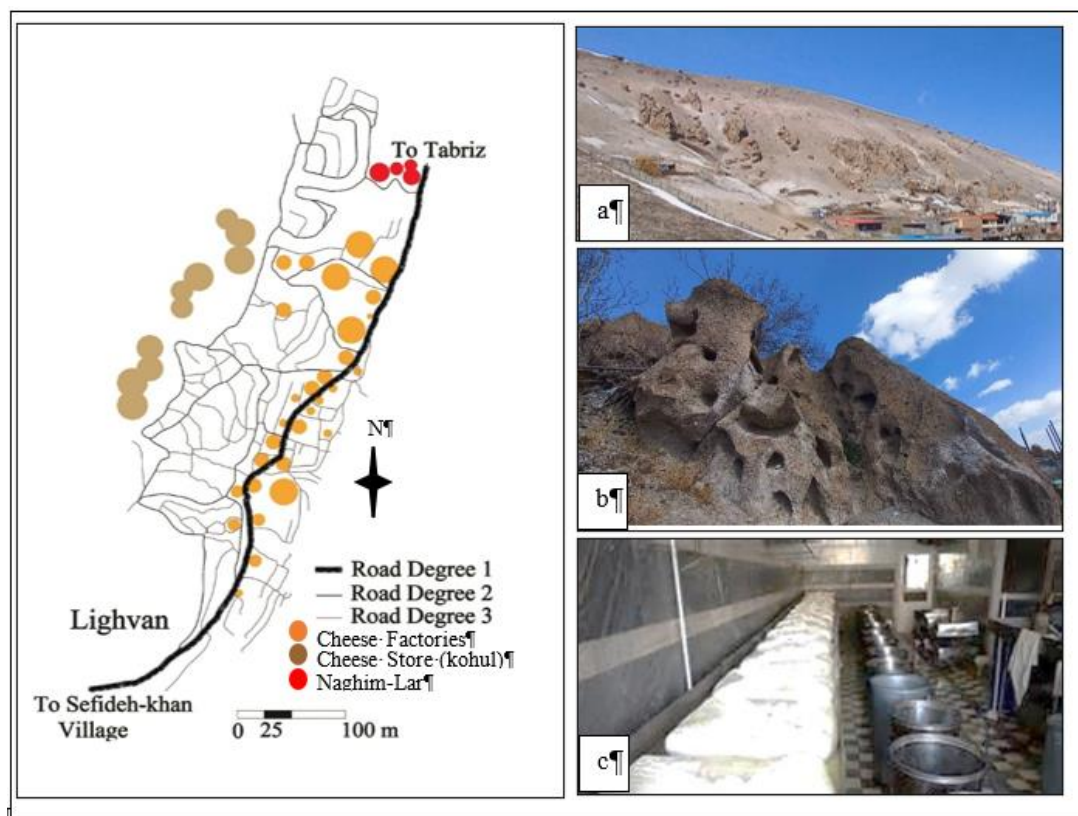


Figure 2. Plan of the location of cheese factories and Nagim in the village, (a) and (b): Views of Naghim-Lar, (c): A Cheese factory.

#### **Milk factory and cheese production workshop-**

Since animal husbandry and milk production are the dominant occupations of Liqvan, many villagers in this village work in numerous dairy and cheese production workshops and milk collection and distribution centers. More than 35% of the village's working population works in these centers (The Rural Guidance [Hadi] Plan of Liqvan Village, 2016). The space of these workshops is in different scales. Some of these workshops have small dimensions of about 2 square meters, and they have allocated a part of the house space for this activity due to health issues. In some newly built houses, the entire parking lot and pilot house floor are reserved for this activity. According to objective observations, some workshops have a maximum floor area of 80-100 square meters, and the internal division includes the main space for cooking milk and preparing cheese, as well as the entrance and pre-entrance areas. It should be noted that in small workshops, all activities occur in that space.

**Outdoor Warehouses-** The warehouse in this village is divided according to the various activities

in the dairy production process. 1. Forage for livestock is located in the outer part of the houses. The "karans" (rocky outcrops) are used in the elevated areas as forage storage. It is worth noting that although most of the karans in the mountainous region are fragmented and rocky, in some parts, the villagers have cleared these karans and used them for forage storage. 2. The storage for dairy products (cheese) during the initial cheese processing stage is located inside the karans due to the suitable temperature. 3. Public and private warehouses are usually built in the newly constructed houses for storing dairy products for sale.

**Cold Storage-** Usually, two stages can be mentioned for storing cheese. 1. The freshly made cheese is transferred to the "Karans." According to the villagers, the Karans provide suitable temperature conditions for maturation. These Karans have the ideal warmth for cheese production. After three months, the cheeses are transferred to cold storage. Due to the abundance of cheese production, several cold storages have been established. One of them is located in the

western part of the village entrance. This cold storage is specialized for this village. However, more significant cold storage is located at the exit of Basmenj, which supports the surrounding towns and Liqvan, and the villagers of this village can also use this out-of-village cold storage if needed.

**Naghim-lar**<sup>vii</sup> (**Karans**)- Naghim-lar is an ancient site where numerous cone-shaped protrusions can be seen, reminding visitors of the Kandovan<sup>viii</sup> village. In the past, the people of the region dug inside some of them and turned them into folds

vii . The word "**Naghim-lar**" in Azerbaijani (Azeri Turkic, mother tongue of the people of Azerbaijan) is the plural form of Naghim. Naghim is a ridge which the type of it is from the lahar, ignimbrite, and ponce complex; as a result of the lava flow, the ash of the volcanic material, which after mixing with the flowing water from snow and rain, turns into a fluid mass, this liquid mud mass hardens after cooling. It is difficult to see clearly in most of the villages of this region (Sahand

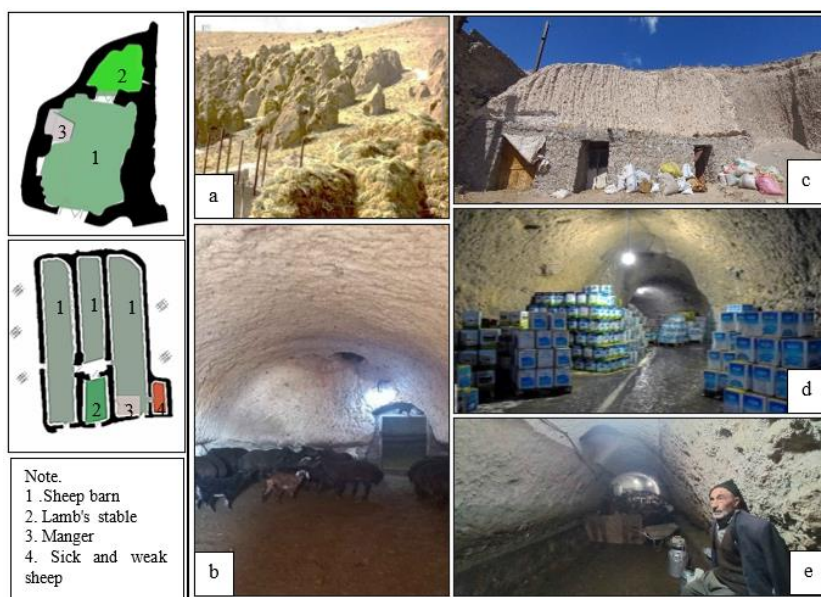
where sheep were kept. The doors of these folds are small and hidden from view. It is also a place for children's play. But it has not been used for residential or living purposes.

**Zaghes**<sup>ix</sup> (**Stone Tunnels**)- These tunnels, which have been manually carved, are essentially tunnels, cavities, and caves made of "Karan" stone, located inside the mountain and under the residential houses. They are used as storage for keeping cheese and sheepfolds. These places are cool in the summer and warm in the winter. (Figure 3).

domain), and they are often called "Karan," but in this village, they are called "Naghim".

viii . Kandovan is an ancient village in Sahand Rural District in the East Azerbaijan Province, northwestern Iran. It exemplifies artificial cliff.

ix . It is a cave-like slum that was dug in the ground in ancient times and used to keep sheep in the winter.



**Figure 3. Plan of Naghim-Lar (top) and Zaghe (bottom)., (a): External view of Naghim, (b): Internal view of Naghim, (c): External view of the tunnel, (d) and (e): Internal view of tunnel (top: cheese warehouse, bottom: barn)**

**Aghol**- Generally, Aghols (traditional sheep/goat pens) are more private and specialized for a single family. New private Aghels are usually carved out of the mountain. Due to the unique natural characteristics of this region and the high strength of the soil, numerous Aghols have been dug at the foot of the hill, which have an arched shape with a 1-meter entrance corridor and a space of about 70 square meters, with a narrow vent to the outside for

ventilation. Due to this region's mountainous and cold climate and the increase in milk quality, they keep the Aghol space warm. Also, this space creates an unsuitable space for milking. However, due to the rise in the number of sheep and the prosperity of the dairy industry, some hygienic principles should be considered. Sometimes, in some newly built houses, due to the existence of "Karans" (natural underground spaces) under the

houses (the houses are located on a slope and there is a "Karan" under the building, and the foundation of the new homes is built on the Karans), they are used as a place to keep livestock, which the natural Karan with the mentioned characteristics is suitable for livestock.

**Jajim weaving space-** Previously, the village women used the yarn obtained from sheep's wool after spinning in Jajim weaving. The Jajim loom was laid horizontally in large dimensions on the ground, and due to its large size, it was usually woven by women outside the house and more in

the open space and threshing floor. Due to lifestyle changes, sheep's wool is sold more and less in homes. Industrial Jajim weaving has also fallen out of fashion.

According to Table 1, the Nghim includes several parts, each with a specific function. The largest area is used for keeping milking sheep, which is also the milking place. Part of the barn's space is reserved for maintaining the lambs, which is 4 to 7 times smaller than the main storage space. Also, for ease of access, space is allocated for livestock food storage (Table 1).

**Table 1. Characteristics of residential spaces**

House type	No	Space Name	Area Defining Factors			Area meter <sup>2</sup>	Area Space	floor height	Form	Location in the Plan
			Door	Wall	window					
stable and warehouse	Naghim	Sheep pen	√	√	×	38	%72	1 Floor	Rectangular	First Layer
		Lamb pen	√	√	×	9.13	%10.8		Trapezoidal	
	slum	Sheep pen	√	√	×	60.92	%28	1 Floor	Rectangular	First Layer
			√	√	×	32.35	%15			
			√	√	×	57.41	%26.4			
		Lamb pen	√	√	×	13.37	%6.15			
		Garner	√	√	×	5.81	%3			

**Other service sectors of the village-** In this village, most of the service activities include dairy shops. Some shops include a bakery, hairdressing, butchery, sale of construction materials, and groceries. The total share of this rural employment sector accounts for 10.50% of all jobs. Due to the easy access to roads and communication roads and the ease of receiving services and facilities, most of the shops and dairy stores stand out in the village's main wall, which has a high building value. Many of these shops stand out on the ground floor of

newly built buildings. Due to the diversity of preparation and sales activities, production (butter and local buttermilk in the back of the shop) usually consists of several departments. An essential part of the space is reserved for sales, and at the back of the shop, there is a room for preparing butter and buttermilk, etc. The maximum size of these shops is about 60 square meters, and the smallest unit is about 6 square meters. It does not have a preparation and production department (The Rural Guidance [Hadi] Plan of Liqvan Village, 2016) (Figure 4)



Figure 4: The outer spaces of the house in the village: (a): rooftops, (b): dairy distribution shops, (c): Jajim knitting, (d): sheep pen in the basement of houses, (e): entrance of sheep pen.

#### 4.2. Inside the houses (before and after 2000 AD)

**Before 2000 AD-** Previously, families were extended and lived in houses with a central space with 1 or 2 adjacent rooms. These houses were single-story and were constructed with mud bricks, with the exterior walls made of mud straw or bricks. The window dimensions on the walls were small in number and size for climatic and security reasons and were mostly made of wooden frames. The roofs of the houses were also usually flat and served as a place to dry garden products. The residential and livelihood spaces were also divided according to specific functions, the relevant elements of which are as follows:

**Main Room-** One of these rooms, usually the largest at around 16-20 square meters, was a place for sitting, eating and drinking, receiving guests, and activities like handicraft production. A traditional clay oven (Kannur) was also used in this room for heating, cooking food, and baking bread. In this village, the leading staple foods were bread and dairy products. The oven also helped provide warmth in the cold climate. Some houses had two clay ovens - one inside the residential spaces for winter use and another outside (sometimes shared with neighbors) for summer use. A part of the main room was also used for storing bedding, rugs, and clothes, separated by curtains. Shelves were built into the walls throughout the rooms, used for decoration, lighting, and holding dishware and

other items. The floor furnishings were typically woven rugs. In the winter, a heated platform called a korsi, with a mattress and rugs, was used for seating and sleeping.

**The Entrance Hall or Astana-** Due to the cold outdoor climate in most houses, a separate entry filter space of approximately 2 square meters with limited length and width was provided. This space was intended for activities such as washing dishes. This area was an entry filter for removing shoes before entering the main living spaces.

**Spinning Room-** The space dedicated to spinning was usually located either inside the house or in the storage area. After shearing the sheep in the spring and summer, the wool was spun into thread to produce Jajim (a type of traditional woven textile) using a semi-industrial spinning machine called a jahre. This traditional spinning machine was considered an essential and indispensable piece of equipment for every rural household, as wool was abundant in the village, and spinning was a thriving activity. Due to the fluff and fibers involved in the spinning process, this space was often enclosed with a door to prevent the spread of fibers to adjacent areas.

The produced threads were then wound into skeins, dyed in the external tandoor (the clay oven), and used in the weaving of Jajim. Due to the cold climate, the production of woolen garments was also widespread. Silk carpets were another product

made by the villagers in this region, with the carpet loom traditionally hung in the storage space. Nowadays, the looms are often set up inside the houses, in one of the rooms.

**Kitchen-** This space was typically used for baking bread and preparing food. A vent and chimney of about half a meter in size were installed above this area to vent the smoke from cooking. The clay oven (tannur) was usually circular and made of stone from the inside. In the winter, this space was used

for a korsi (a traditional heater) to accommodate sleeping space for up to 4 people. It's worth noting that the courtyard space was usually used for baking bread in the summer.

**Storage-** A section of the courtyard was typically allocated for storing fodder for livestock and firewood for domestic use. Even today, in many homes where bread is baked indoors, the firewood is stored in the open space of the house (Figure 5).



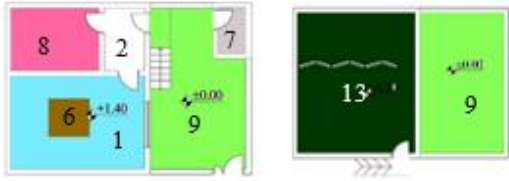
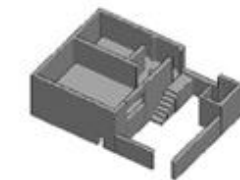


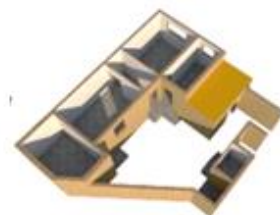

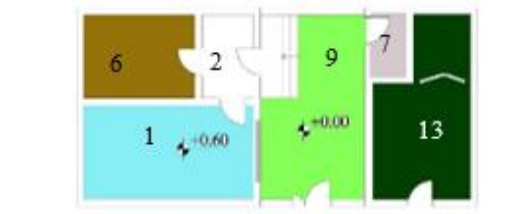


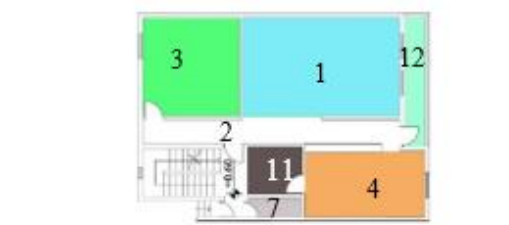


Figure 5. (a): Jahrehkhana, (b): Korsi, (c): Carpet weaving room, (d): Traditional Clay Oven.

#### 4.3. After 2000 AD

Since 2000, the houses in this village have undergone significant physical changes and transformations. Families have shifted from extended to nuclear households, and instead of being based on a livelihood-oriented approach, the houses are now more focused on aesthetic principles. In the past, housing was closely connected to nature and human living environments, and it could only continue adapting to them. However, the current cultural and social changes in the lives of villagers have brought about changes in areas such as the diversity of use of new tools and facilities (modernism) within the dwellings and the design and architectural plans that are different from traditional rural housing patterns (i.e., with approximately two bedrooms, a kitchen, a living room, and services).

Due to lifestyle changes, the Liqvan houses have become more urban and have lost their traditional form. However, despite the significant changes in the face of the village, Liqvan has yet to become truly urban, and the rural way of life continues alongside the urban way of life. The residential spaces are similar to urban dwellings in the new houses, which are often built on multiple floors. Still, the livelihood-related spaces, such as the animal pens or stone tunnels, are located outside the home or in the basement. The village also has a bakery; sometimes, the neighbors' ovens are used for baking bread. Dairy production and processing also take place in workshops and cold storage. The following presents six examples of traditional and contemporary housing samples which shows plans, 3D view and Sample image of interior spaces (Table 2).

Table 2. some houses of Lighyan village

Type	No	Space Name	3D view	Sample image of interior spaces
Traditional House	No 1			
	No 2			
	No 3			
Modern Housem	No 4			

There are common patterns and practices among all the examined houses, such as the fact that it often enters the threshold space after the entrance and accesses the living room from there. The oven is located in the middle of that space, and the spinning and nettle space is placed in the last layer and corner of the building. Regarding the differences between traditional and contemporary houses, old houses have more functional diversity with less spatial diversity. The yard has been very dominant in this house. Many activities took place in the yard, including small-scale milk and cheese making, animal husbandry, spinning, bread baking, firewood and straw, and even storage of dairy products. Inside the house, spaces such as the living room, kitchen, and storage were in one

space. However, in newly established houses, based on the change of lifestyle, the division of internal spaces has varied dramatically, and some spaces, such as the kitchen, bedroom, and living room, have been separated. Also, activities such as cheese making have been transferred to workshops separately, and the pen space is located in the lower part of the house (due to the stepped development of today's houses and the location of the spaces dug in the heart of the mountain, these spaces have become a place to keep livestock).

With the limitation of the activities of the house in the contemporary period, following the change in the type of employment and the transfer of most livelihood activities from inside the home to the space outside it, the house has become a place for

personal activities, and this has caused the transformation of the room multi-functional space has become a single-functional space. Also, with the installation of independent rooms in the courtyards of today's houses, some of the former activities, such as baking bread and storage, are carried out in this space. It is clear that it is impossible to maintain the native context of the village, and the villages will inevitably be affected by the changes that occur. It should be accepted

that if in the past, various activities, especially economic and livelihood activities in the heart of the residential spaces of the villages, acted as an unwritten law, today it has faded due to the mentioned cases. Still, the town of Liqvan has various functions and roles in the economy and even tourism. Therefore, it can play a prominent role in guiding and leading business activities at the level of the villages in the region (Table 3).

**Table 3. Typology of defining spaces in rural houses (traditional-modern)**

House type	No	Space Name	Area Defining Factors			Area meter <sup>2</sup>	Area Space	floor height	Form	Location in the Plan
			Door	Wall	window					
Traditional House	No 1	Living room	√	√	√	20.27	%20	1 Floor	Rectangular	First layer
		Entrance hall	√	√	×	5.53	%5.5			
		The Oven	√	√	×	11.83	%11.7			
		WC	-	-	-	2.88	%3			
		Yard	√	√	×	24.57	%24.3			
		Sheepcote	√	√	×	19.51	%19.3			
	No 2	Living room	√	√	√	27.22	%29.6	2 Floor	Rectangular	Second layer
		Entrance hall	√	√	×	5.51	%6			
		WC	√	√	×	2.89	%3			
		Store	√	√	×	12.06	%12.5			
		Yard	×	√	×	29.78	%3			
		Sheepcote	√	√	×	33.85	%34			
	No 3	Living room	√	√	√	47.18	%47.5	1 Floor	Rectangular	First layer
		Entrance hall	√	√	×	17.34	%11.8			
		Bed room	√	√	√	5.54	%3.8			
		Kitchen	√	√	√	15.6	%10.6			
		Roof	√	×	×	8.87	%6			
		The Oven	×	√	×	12.26	%8.3			
		WC	×	√	×	2.74	%2			
		Store	√	√	×	3.09	%2.7			
		Yard	√	√	×	12.29	%8.4			
Sheepcote		√	√	×	48.22	%33				
Modern House	No 4	Living room	√	√	√	14.77	%21.3	2 Floor	Rectangular	First layer
		Kitchen	√	√	√	12.64	%18.2		Trapezoidal	First layer
		Roof	√	√	×	35.89	%51.7		Trapezoidal	Second layer
		WC	√	√	×	1.50	%0.2		Rectangular	First layer
		Store	√	√	√	19.60	%28.2		Trapezoidal	Second layer
		Sitting Room	√	√	√	20.39	%29.4		Rectangular	First layer
		Living room	√	√	√	26.91	%10.6		1 Floor	Rectangular
	Entrance hall	√	√	√	18.31	%7.2				
	Kitchen	√	√	×	12.13	%4.7				
	WC	√	√	×	4.44	%1.7				
	Yard	√	√	×	119.72	%47				
	Sitting Room	√	√	√	9.12	%3.6				
	Bath	√	√	×	3.18	%1.3				
	Carpet Weaving Room	√	√	×	19.02	%7.5				

House type	No	Space Name	Area Defining Factors			Area meter <sup>2</sup>	Area Space	floor height	Form	Location in the Plan
			Door	Wall	window					
No 1		Living room	√	√	√	36.11	%26.3	1 Floor	Rectangular	First layer
		Entrance hall	√	√	×	15.01	%11			
		Bed room	√	√	√	22.41	%16.3			
		Kitchen	√	√	√	18.41	%13.4			
		WC	√	√	×	2.36	%1.7			
		Bath	√	√	×	6.31	%4.5			
		Carpet Weaving Room	√	√	√	6.59	%4.8			

According to the present research, two axes perpendicular to each other are considered to show how the space is organized in the taken plans. On its ground (horizontal) axis, the spatial layers from the entrance to the building are displayed, and on the sky (vertical) axis, the spatial layers are shown up to the roofs of the houses. On the horizontal axis, the layers surrounding the entrance are presented as the first layer, and in the same way,

the farthest spatial layer from the entrance is the last layer, and on the vertical axis, the existing floors are presented. From the intersection of horizontal and vertical layers, specific and defined spaces have been formed, and according to their up and down or backward and forward, various spaces have emerged according to the needs of the family (Figure 6).

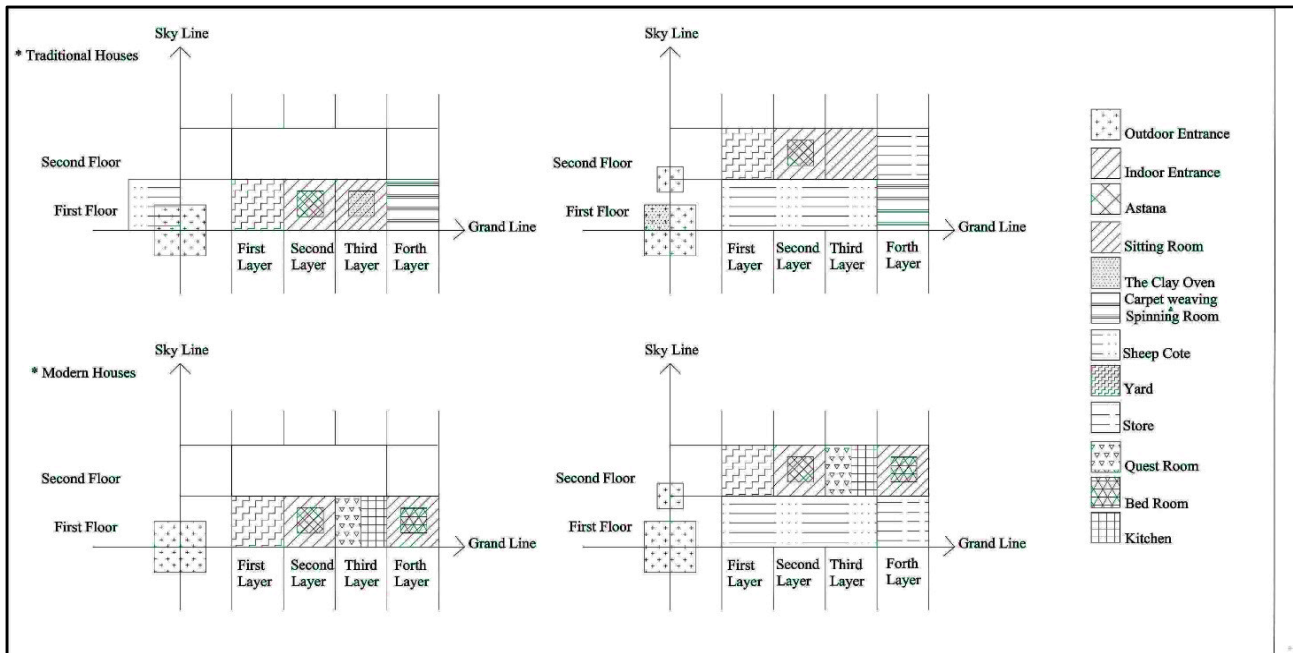


Figure 6. Showing the spatial network and pattern of settlement of residential spaces.



## 5. Discussion and Conclusion

The research findings indicate that in recent years, numerous morphological changes have occurred in the structural organization of rural houses in Leigu. On the other hand, considering the technological advancements in livestock production methods, this activity is highly popular and significant in the local economy. Furthermore, analyzing the relationship between the production system and the spatial organization of the village of Leigu suggests that the village's economy is seasonal, primarily based on agriculture and animal husbandry during the farming seasons.

The production of dairy products in the non-agricultural seasons and activities such as carpet weaving are also the second priority of income sources. Given the dominant economic activity in this village (animal husbandry), the spaces for keeping livestock and storage make up a larger share of the village spaces. These spaces are kept outside the residential fabric on the banks or in the sheds built on the mountain's slopes. In addition, these banks are the main element for storing dairy products, including cheese.

Regarding the typology of residential spaces, in the traditional period of livelihood, it had an essential role in the formation and spatial composition of the village houses. The old residential spaces of Liqvan were formed in response to functions and with appropriate internal divisions so that living facilities are provided in the long run. Many activities, such as livelihood activities such as animal husbandry, agriculture, and other service work (spinning, weaving, etc.), as well as living and cultural activities such as cooking, health issues, eating and sleeping, family gatherings, guest affairs, holding celebrations, etc., have been realized in the house spaces, and sanitary facilities (toilet, bathroom), pens and some others have been primarily located outside the houses. However, in line with the contemporary wave of change and changing the needs of the present age, especially the significant shift in income from traditional activities to mass dairy production, in the newly built houses, the living spaces have often been converted into living spaces, and for the sake of comfort, sanitary spaces, and kitchens have been added to the houses, and due to the fame of this village in cheese production, the establishment of workshops and cold storage in the village has boomed, but some of the livelihood needs such as

pens are still being carried out in the basement or a corner of the yard; Although with the increase in the number of sheep, pens have been dug in the heart of the mountain. The newly built houses do not have much in common with local customs and traditions and do not show any harmony with the indigenous architecture.

Nevertheless, the robust and productive role in the village (mass production of cheese and its export) indicates that the use of solutions for developing and regenerating such villages is an undeniable necessity. Stabilizing rural centers, creating production and income hubs, and reviewing rural development and housing strategies and policies with a focus on local potentials, conditions, and the interests of the residents should be the focus. The valuable volume of dairy and handicraft production in Liqavan and the neighboring villages requires the establishment of large production and supply centers in that area. Alongside establishing production and workshop complexes across the village, villagers can develop economic and livelihood activities within the residential spaces. In this way, by activating the members of the households and even the neighbors, various production costs, such as human resources, facilities, etc., can be reduced. It is possible to use the excavated spaces within the land for the workshop products' sales spaces and design recreational spaces such as cafes, coffee shops, etc. This will establish a logical connection between training and production in local workshops and the sales and display section.

When comparing these results with previous research conducted in other rural areas of Iran and similar settings, it becomes evident that economic and technological advancements universally influence rural spatial patterns. Past studies emphasize that traditional rural architecture was closely linked to local livelihood activities, primarily agriculture and animal husbandry, and served functional purposes aligned with these activities. Our findings reinforce this understanding but also highlight the ongoing impact of modernization in considerable regional differences.

In conclusion, understanding this evolving relationship is essential for developing effective rural regeneration strategies that preserve cultural heritage while accommodating socio-economic progress. The insights from this study align with

earlier research, emphasizing the importance of integrating local potentials, traditional architecture, and modern livelihood needs to foster sustainable rural development.

In addition to the mentioned cases, we know that the elders have been aware of the location, time, and conditions in the past, and their participation should be directed toward appropriate regeneration. Many activities and spaces should be more thoroughly considered, as local products can no longer be processed similarly. For example, in the competitive world of dairy production, there are various types of cheese, butter, and even yogurt, and several new activities related to the wool industry can be observed. The crucial point is that there is no choice but to move towards new productions and the reproduction of past activities and services in the form of production clusters,

with the technical and specialized consultation of knowledge-based companies in developing spaces and production and service processing. In this regard, attention to indigenous architecture and the regeneration of indigenous and local spaces can add to the natural beauty and tourism of the village and the region on the lush slopes of Sahand in Tabriz.

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#### **Authors' contributions**

The authors equally contributed to the preparation of this article.

#### **Conflict of interest**

The authors declare no conflict of interest.

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## بررسی نقش تولیدات دامی در سازمان فضایی روستای تاریخی ليقوان

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### چکیده مبسوط

#### ۱. مقدمه

مقاله حاضر با مروری اجمالی بر شناخت روستا، به تحلیل ارتباط میان نظام تولیدی و خلق سازمان فضایی روستای ليقوان از توابع شهرستان تبریز می‌پردازد. پیش از تحولات معاصر (غالباً پس از انقلاب اسلامی ۱۳۵۷ شمسی)، کالبد این روستا با مرکزیت تولید و معیشت محوری در مقیاس محلی ساخته شده بودند، به گونه‌ای که تولید لبنیات، نگهداری دام و خورد و خوراک همگی در فضای محدود خانه‌ها اتفاق می‌افتاد و از فضای کران‌ها نیز گاه بعنوان آغل استفاده می‌شد. اما از نیم قرن گذشته و با رونق تولید برند پنیر ليقوان و همچنین در پی ظهور تکنولوژی و ... و بالتبع خلق نیازهای جدید؛ نوع کالبد آن چه به لحاظ فضاهای زیستی و چه معیشتی، تفاوت‌های بنیانی به خود دیده است. در این پژوهش، محقق سعی می‌کند، رابطه فعالیت‌های معیشتی و بالاخص اقتصادی (تولید انبوه پنیر) با سازمان فضایی روستای ليقوان را شناسایی و تبیین نماید. سوالات اصلی این پژوهش عبارتند از: رابطه بین تولید محصولات دامی (لبنیات- گوشت و پشم) با سازمان فضایی روستای ليقوان در گذشته/ حال و آینده چیست؟

#### ۲. مبانی نظری تحقیق

فضا بستر نیروی تولید است، زیرا مالکیت فضا به‌عنوان ابزار تولید و سازمان‌دهی روابط تولید، شیوه‌ی تولید را شکل می‌دهد و در این حالت کسی که مالکیت فضا را در دست دارد، متعاقباً قدرت سازمان‌دهی و کنترل بر فعالیت‌هایی که می‌تواند یا باید در فضا انجام شود، را نیز خواهد داشت. با توسعه مکان‌های جدید، مکان‌های قدیمی برای در برگرفتن عملکردهای گوناگون تغییر داده می‌شود. لذا نقش مهم تولید فضا و ارتباط نزدیک آن با بخش‌های دیگر اقتصاد مسکن روستایی مشهود است. تولید فضای مصنوع به‌واسطه مقیاس و اهمیتش، از پویایی درونی و ظرفیت‌های قابل توجهی برخوردار است

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که کاربران را به یافتن فرصت‌هایی برای استفاده از ظرفیت‌های تولیدی و سود ترغیب می‌کند.

#### ۳- روش تحقیق

این مطالعه در دو بخش کتابخانه‌ای و مطالعات میدانی انجام پذیرفته است. در بخش نظری از منابع کتابخانه‌ای و در بخش میدانی با روش «پدیدارشناسی» انجام می‌شود. لذا از مشارکت ۱۰ نفر از افراد مسن‌تر و باتجربه‌تر، تا حد اشباع مصاحبه صورت گرفت. روستای ليقوان در جنوب شرقی شهر تبریز در یکی از دامنه‌های کوه سهند، بر روی تپه‌های رو به خورشید - به‌صورت پلکانی - در دوره اوایل اسلام شکل گرفته است.

#### ۴- یافته‌های تحقیق

آنچه در این روستا کانون توجه بوده و هست مربوط به امور لبنیاتی است. در این خصوص فضاهای زیادی وجود دارد، بخشی برای نگهداری از دام‌ها (زاغه- آغل- کران)، بخشی برای تولید و فرآوری محصولات دامی. فضاهای بیرونی عبارتند از: شیرپزخانه و کارگاه تولید پنیر، انبارهای بیرونی، سردخانه، نعیم (کران)، زاغه‌ها و تونل‌های سنگی، آغل، فضای بافت جاجیم، سایر بخش‌های خدماتی روستا: در این روستا، بیشتر فعالیت خدماتی شامل فروشگاه‌های لبنیاتی می‌باشد.

سازمان فضایی داخل مساکن روستا به دو بخش (قبل و پس از دهه ۸۰ شمسی) تقسیم می‌شود. قبل دهه ۸۰ شمسی فضاهای زیستی و معیشتی نسبت به عملکردهای خاص تقسیم‌بندی شده‌اند که شامل فضاهایی چون اتاق اصلی، دهلیز یا آستانا، اتاق ریسندگی، مطبخ، انبار می‌شود. از دهه ۸۰ شمسی به بعد، خانه در این روستا با تغییرات فیزیکی زیادی همراه بود. تغییرات فرهنگی-اجتماعی در زندگی روستاییان مانند تنوع استفاده از وسایل و امکانات جدید (مدگرایی) در داخل مساکن و طراحی و پلان‌های معماری متفاوت از معماری

کنار راه اندازی مجموعه های تولیدی و کارگاهی در گستره روستا، می توان بخشی از فعالیت های اقتصادی و معیشتی روستاییان را در دل فضاهای داخل مسکونی توسعه داد و بدین ترتیب با فعال نمودن اعضاء خانوارها و حتی همسایگان هزینه های مختلف تولید چون نیروی انسانی، تاسیسات و ... را کاهش داد. حتی می توان از فضاهای کنده شده در دل زمین، برای فضاهای فروش تولیدات کارگاه استفاده کرد که در کنار آن طراحی فضاهای تفریحی اعم از کافه، قهوه خانه و ...، منظور نمود. بدین سان می توان ارتباط منطقی بین آموزش و تولید در کارگاه های محلی و بخش فروش و نمایش آن برقرار کرد.

**کلید واژه ها:** تولیدات دامی، تولیدات لبنی، سازمان فضایی، مسکن، روستای ليقوان.

### تشکر و قدرانی

پژوهش حاضر حامی مالی نداشته و حاصل فعالیت علمی نویسندگان است.

سنتی در الگوی خانه روستایی به وجود آورد. خانه های جدید که غالباً در چند طبقه اجرا می شود. بخش های زیستی چون خانه های شهری است، اما بخشهای معیشتی همچون آغل یا در بیرون از خانه (تونل های سنگی) قرار دارد یا در طبقه زیر زمین خانه ها است.

### ۵- بحث و نتیجه گیری

نقش تولیدی قوی در روستا (تولید انبوه پنیر و صادرات آن) نشان می دهد، بکارگیری راهکارهایی برای احیاء و بازآفرینی چنین روستاهایی یک ضرورت انکارناپذیر است. تثبیت مراکز روستایی و ایجاد کانون های تولید و درآمد، بازنگری در راهبردها و سیاست های توسعه و مساکن روستایی با تاکید بر پتانسیل ها و شرایط بومی و محلی و علایق ساکنین باید مورد تمرکز باشد. حجم ارزشمند تولید محصولات لبنی و صنایع دستی در ليقوان و روستاهای مجاور ایجاب می کند که مراکز بزرگ تولید و عرضه در آن بخش به وجود آید. در

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