CUKUROVA'S FARM BUILDINGS: A SYNTACTIC ANALYSIS OF HISTORICAL EVOLUTION AND CONTEMPORARY ADAPTATION

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CUKUROVA'S FARM BUILDINGS: A SYNTACTIC ANALYSIS OF HISTORICAL EVOLUTION AND CONTEMPORARY ADAPTATION

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For anyone interested in agriculture and architecture relation.

ABSTRACT

In Turkey, numerous studies have focused on the traditional architectural heritage in rural areas; however, there is a notable lack of architectural research centred on farms. The agricultural sector has undergone significant transformations in the past three decades due to advancements in production methods, reduced labour requirements, and changing product demands. As a consequence, traditional farm spaces have been compelled to transform.

In this study, the region of Cukurova was selected as the research area due to its high economic significance and its importance in understanding agricultural practices in Turkey. The agricultural transformations occurring in Cukurova are evident in the spatial elements of farms, space syntax, and human behaviour. Fifteen active farms, constructed between 1850 and 1950, were chosen for analysis to identify traces of technology and human behaviour within the farm spaces. The objective was to delineate the boundaries between shared and private areas.

Two sets of data were collected to test the research hypothesis's validity. The first set comprised behavioural data gathered through direct observations, while the second set consisted of plans generated from photogrammetric models created using drone photographs. Space syntax analyses were conducted to explore the farm layouts based on these plans.

The findings of this research illustrate how the utilization of farms has evolved in response to technological advancements and changing living conditions. Recent shifts have defined and allocated private and production areas within farm layout plans. These morphological changes hold significant implications for modern farming practices, underscoring the need to examine the spatial adaptation processes within farm areas in Cukurova. Consequently, this thesis aims to shed light on the progressive spatial planning of farms over time and offer insights into sustainable spatial planning practices, particularly in contemporary and modern agricultural spaces.

ÖZETÇE

Türkiye kırsalındaki geleneksel yapı stoğu hakkında çeşitli çalışmalara vardır ama çiftlikler üzerine olan mimari çalışma yok denecek kadar azdır. Son 30 yılda gelişen tarımsal üretim yöntemleri, azalan iş gücü ihtiyacı ve değişen ürünler eski çiftlik mekanlarını dönüşüme zorlamıştır.

Bu çalışma için Cukurova Türkiye'de tarımsal anlama ön önemli ve ekonomik atma değeri en yüksek bölge olduğu için çalışma alanı olarak seçilmiştir. Bu tarımsal dönüşüm durumu Cukurova'da çiftliklerin mekansal elemanlarına hem mekan dizimine heöde insan davranışlarına yansımaktadır.. Bu nedenle Cukurova'da 1850 ve 1950 yılları arasında inşa edilmiş ve hala aktif olan 15 çiftlik seçilmiştir. Çalışma, ortak ve özel alanlar arasındaki sınırları ortaya çıkararak, çiftlik mekanlarında teknolojinin ve insan davranışının izlerini bulmayı amaçlıyor. Hipotezin geçerliliğini test etmek için iki farklı veri seti elde edilmiştir. Birincisi gözlemler yoluyla elde edilen davranışsal verilerden oluşur. İkincisi ise, drone fotoğrafları ile oluşturulmuş fotogrametrik modeller sayesinde çizilen planlar olmaktadır. Bu planlar sayasında da çifltiklerin mekan dizim analizleri yapılmıştır.

Bu araştırma, çiftliklerin kullanımının teknolojik değişimler ve yaşam koşulları açısından zaman içinde değiştiğini göstermektedir. Son zamanlarda çiftlik yerleşim planlarında özel alan ve üretim alanı tanımları değişmeye başlamıştır. Bu son morfolojik değişiklikler, çağdaş çiftliği önemli bir olgu olabilir. Bu nedenle bu tez ile Cukurova'daki çiftlik alanlarının mekânsal uyum sürecini ortaya koymak amaçlanmıştır. Bu nedenle, çağdaş tarım ve sözdizimsel çalışmalar, çiftliklerin adaptasyonunun zaman içinde nasıl ilerlediğini göstermektedir. Bu çalışma aynı zamanda özellikle çağdaş/modern tarım ortamlarında sürdürülebilirlikte mekansal planlamayı öngörmeyi amaçlamaktadır.

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CHAPTER I

INTRODUCTION

Cukurova is a region in Turkey which includes Mersin, Adana, and Antakya provinces. Cukurova is bounded north by the Taurus Mountains and south by the Mediterranean Sea. Cukurova bridges Anatolia, Mesopotamia, and the Eastern Mediterranean, connecting these areas via sea, land, and rivers. Thus, it is essential for the history of civilization with its vast lands suitable for agriculture [1].

The first settlement in Cukurova dates back to the Neolithic Period and the Yumuktepe archaeological site. The site, which dates back to 7000 BC, is the first settlement area discovered during the emergence of agricultural settlements [2]. The first farm structures that still exist today are peristyle courtyard houses, also known as Villa Rusticas, from the period of the Roman Empire. These were only found in Roman archaeological sites east of Mersin [3]. However, there is a 1700-year gap in historical sources to understand the evolution of farm buildings in Cukurova. In the 1900s, infrastructure works increased in the region during the Republican period. Bourgeoisie families were brought in to grow the agricultural economy in the area [4]. All working farm structures belong to these periods.

Predominantly, at their first use, the farm buildings in Cukurova were planned as open spaces to be protected from external factors. Nonetheless, with the global transformation experienced in the last century, the settlements and the environmental perception towards these settlements have started to change. As a result, the agricultural values in the Cukurova region have started to change from what they once were and, in some cases, have disappeared entirely.

This study aims to conduct a syntactic analysis of 15 farms in various Cukurova areas. Although these farms were built in different periods, most have similar typological layouts. Therefore, the objective is to reveal the syntactic similarities and differences of their

transformations by examining the spatial relations of these farms. The study also aims to show how the farms' social and cultural structure and changes in agriculture affect their layout and organization.

1.1. Purpose of Study

The dynamics that affect the development and change of farms built in different periods in Cukurova are both due to changes in personal needs and as a result of production technology in agriculture, the socio-economic status of the farmer, cultural factors and changes in the products produced. In this context, one of the essential dynamics affecting the development of the farm space can be the spatial formations associated with some behaviours that vary over time, arising from the user's space usage behaviours and preferences.

One of the main goals of this study is to investigate how farms plan, lay out, divide, and connect spaces. That includes examining how agricultural products influence these decisions and how the agricultural production process shapes farm plans. We aim to examine why farms change at various stages and thresholds over time, using the space syntax method to analyze the provided data. We will also explore space's physical and intangible dynamics in this context. The primary objective is to comprehend how farms have evolved in response to the needs of the farm and changes in space syntax data.

In Cukurova, there have been changes in infrastructure, technology, and socio-economics since the 20th century and later during the Republican Period. Additionally, it is clear that changes in products and the evolution of farms, which serve not only agricultural purposes but also private living spaces, introduce differences in the planning of farm structures.

The current condition of Cukurova's farm architecture shows that areas with different functions have become more diverse. The functions and space position within the overall plan has changed according to different factors. Additionally, new separations and additions of some elements from the entire plan result in changes in syntax over time. In other words, with the shift in technology and needs, farm plans show differentiation regarding usage and space syntax. The

differentiation of the spaces used in daily life on the farm is critical for us to read/understand the farm spaces in relation to productive spaces and residential spaces due to changes in the relationship and hierarchy of the spaces with each other. Along with the syntactic analyses that will be discussed within the scope of the thesis, the spatial differences, changes, and similarities created by the effective thresholds in the transformation of farms will be examined.

1.2.Methodological Approach and Scope of Study

We study changes in the morphology and organization of farming spaces over time. That includes changes in construction technologies, technologies used in daily life within the space, the evolution of agricultural technology, and changes in the products produced. These factors are considered essential to our investigation. This situation requires us to be aware of the spatial differentiation that can be measured with syntactic data, as well as the changes in agricultural production arising from some dynamics.

After the 1960s, Turkey focused on developing soil and water channels and increasing productivity in the agricultural sector. Half of the Ministry of Agriculture's budget was designated for the South East Anatolia Project (GAP), which aimed to develop soil and water resources. The Lower Seyhan Plain Project (ASOP) and Berdan Irrigation Canals projects were the largest irrigation projects in Cukurova, which saw a significant agricultural transformation. The increase in the production of fresh fruit and vegetable products led to a change in the spatial needs of farms. Despite having only 4.76% of the arable land in Turkey, Cukurova accounts for 13.94% of the current production [5].

Politics, the environment, and infrastructure changes can directly impact the architectural environment. According to Mugerauer (1994), relations with space should be considered together with the opposites of many factors such as materials, techniques, needs, climate, food, etc [6]. He emphasizes the importance of considering many concepts that can create semantic and syntactic data together with their opposites using the dialectical method of thinking in this context. The relationships created by these different situations enable farm

structures to evolve and transform according to conditions. Within the scope of the research, the development of farm structures, especially the transformation from field agriculture to orchard agriculture, will be discussed. This discussion will also include space syntax, technological change, and environmental theories related to farm transformation.

Spatial changes in farms can be made more comprehensible using space syntax data as a systematic approach. According to Hillier and Hanson's (1984) space syntax theory, relations between external influences produce forms and social forces[7]. This way, the method used to describe the built environment will provide essential data. However, if we only analyze the structure of farms within the scope of this study, we would not be able to establish a relationship between past and present changes. Therefore, we will analyze the oldest and current farm layout plans within the scope of the study. By comparing these two situations, we will quantitatively demonstrate the spatial changes that farms have undergone. We will then determine the common and different features of current farm layout plans and discuss the spatial characteristics of modern farms. That will reveal how farm structures have changed on average over the past 70 years and in which direction they have transformed.

Analysis was conducted on 15 farm buildings in Cukurova to perform a syntactic analysis of these farms. Four farms are in Adana, while the rest are in Mersin. Since all farms have the same geographical conditions and are located in the Cukurova region, the city they are located in was not considered a factor. Two different data sets were used during fieldwork on these farms. The initial dataset is qualitative and contains details on farm users, space functions, land characteristics, and patterns of behaviour observed during interviews and observations with the farm owners. The second data set consists of farm plans for syntactic and other spatial studies.

Before starting the fieldwork, the farms must be selected to have certain common conditions to validate the hypothesis. These farms are connected to at least 150 decares of land, and these agricultural lands have been processed for at least 100 years. It is vital that the owners of these lands, which have high economic returns, have financial opportunities

for various transformations to their farms over time. Thus, their economic status can be ignored when examining their differences. In addition, it was ignored that they only do orchard farming or field farming, but they were not selected because the needs of livestock farms are very different spatial needs. Since Cukurova was determined as the location, the farms were randomly selected from various districts of Adana and Mersin. Finally, we got permission from the farm owners and regional authorities to start working in the fields.

The fieldwork was conducted individually, so the photogrammetry technique was utilized to draw the farm plans instead of traditional surveying methods. Photogrammetry is a contemporary method that was suitable for this task. The fieldwork of the farms could be completed in 1-2 days, depending on the weather conditions, without the need for very detailed measurements, and the plans could be drawn with individual work. To create precise 3D models of farms, we used DJI's "Mavic Air 2" drone and phone camera to capture over 500 photos from all angles. The photogrammetry engines "RealityCapture" and "WebODM" achieved over 95% accuracy. We successfully transferred the sketches onto 3D models in ".obj" format using "Rhinoceros".

The "Syntax 2D" program developed by the "University of Michigan" (UM) in the field of space syntax was used in the syntactic analysis in this study. "Syntax 2D", which is used as a tool for syntactic analyses, is currently the main syntactic measurement "isovist area", "isovist perimeter", "occlusivity", "compactness", "connectivity", "mean depth" and "integration" values. In addition, radial mean, radial variance and standard deviation from radial data were examined. In this context, the syntactic data and visual schemas obtained in two dimensions are essential for area analyses that can be seen and perceived in the plan.

In the context of the thesis study, sources such as agricultural records and research emphasizing spatial changes and environmental design will be examined briefly. As an academic written work on farm structures and spaces, the works of "Sabri Oran" (1954 & 1961) have been an important source when defining farm structures structurally and spatially[8, 9]. Various histograms will be created with quantitative syntactic data, and their

relationship with the reference points will be discussed. In this context, a research setup in which farm space changes can be examined through plans gains importance in the thesis.

1.3. Results of the Chapter

This thesis generally examines the spatial design and transformation of 15 farms in Turkey's Cukurova region. The analysis focuses on the logic of separations and integrations in farm spaces, differentiation of products, and shaping of farm plans. The study uses the space syntax method to understand better how ecological, social, and cultural factors shape farm space and how it transforms in response to changing conditions. The analysis identifies patterns and best practices in spatial design and informs decisions about the farm's future.

To achieve this, the study analyzes 15 farms from various locations in the Cukurova region of Turkey, selected based on common conditions, using photogrammetry for plan schemes instead of traditional survey methods. The syntactic analysis was performed using the "Syntax 2D" program developed by the University of Michigan. This program measures various aspects of farm geometry, such as isovist area, isovist perimeter, occlusivity, compactness, connectivity, mean depth, and integration values. Radial data will measure the degree of radial connectivity within an architectural network.

In addition, this thesis explores theories related to the relationship between the physical environment and human behaviour. It discusses using space syntax techniques in architecture to understand the nature of designs and relationships between similar structures. The study investigates "privacy," territoriality, and "defended space" theories and their influence on the understanding, designing, and changing of space in architecture.

This thesis comprehensively explains how ecological, social, and cultural factors shape farm space and how it transforms and evolves in response to changing conditions. By taking into account these factors, the study aims to effectively address the needs of each one and make informed decisions about the farm's future.

CHAPTER II

TRANSFORMING FARM STRUCTURES IN CUKUROVA: THEORETICAL FRAMEWORK

This chapter explores the relationship between farm buildings and their environment from various theories, including ecological, cultural, behavioural, architectural design and space syntax. The first chapter discusses the ecological principles that shape the layout and design of farms and how they optimize the use of natural resources. The second chapter examines the cultural significance of farm buildings and how they reflect the values of the people who build them. The third chapter looks at the transformation and evolution of farm buildings over time and how they adapt to changing social and environmental conditions. Finally, the fourth chapter explores the theory of space syntax and its application in farm design, highlighting the importance of understanding the spatial relationships between different primary areas of a farm. This thesis aims to comprehensively understand the complex relationship between farm buildings and their environment through these perspectives.

2.1. Theoretical Discussion on Farm Environment

The relationship between organisms and their environment is a central concept in ecology-based theories and is particularly relevant in the farm space. According to Michelson (1970), ecology is a scientific discipline that explores the mutual relationship between organisms and their environment, and this concept is essential to understanding agricultural practices[10]. The geographical and ecological factors that shape the landscape, such as climate, topography, and soil quality, are critical determinants of agricultural productivity [11]. The layout of a farm is

influenced by various factors, including production methods, technological advancements, and organizational structures, which are all interconnected and affect the ecological balance of the surrounding environment [12]. Therefore, integrating ecological principles, geographical knowledge, and technological innovations is crucial for understanding the farm space.

When considering the evolution and growth of a farm, one can assess behaviour patterns by examining the relationship between humans and the physical environment, which emerges because of their actions in space. One of the most critical factors in forming behavioural patterns is the physical elements found in spaces [13]. These physical elements can include pergolas, agricultural equipment, tractors, workshop equipment, or greenhouses for a farm structure. The perception of these physical elements with our senses and the reaction in this process is essential. Physical elements affecting the organizations and relationship levels of farm spaces are also the determinants of the spaces due to the behavioural forms arising from various requirements arising from our daily physical or production method needs. These physical elements may vary as farm irrigation systems, electrical systems, special warehouses, agricultural equipment, and such systems concerning the day's technology. By analyzing the equipment of different sizes used, it is possible to evaluate any building in terms of its impact on the changing space and behavioural patterns. The physical changes in an action arising from altering action patterns in farms, and conversely, physical changes occur periodically in response to these action pattern modifications.

Moreover, depending on the pattern of behaviour, interactions between individuals can stand out, and a mutual relationship can be suggested between behaviour and spatial configuration [14]. According to Barker (1960), spatial behaviour includes issues related to identity, social and cultural position, thought structure, mental perception, and interaction of all temporal, social, and physical dimensions[15]. According to this definition, if we are referring to an area under the control of individuals in a specific job description, this area is called the "performance area" [16]. The venue's rural or non-rural location is critical to understanding the evolution of spatial arrangements and the control exerted by individuals, objects, or animals over different areas. Examining the spaces under the control of individuals, objects, and animals is essential in Barker's

(1968) theory of behaviour through the concepts of milieu and synapomorphy [16]. According to Barker's (1968) cognitive theory, the term "milieu" refers to the influence of an individual's environment on their behaviour and thought patterns. That includes the environment's physical, social, and cultural aspects that shape an individual's experiences and perceptions. For example, farms create a milieu due to being located in rural areas because living a different life pattern disconnected from the dynamics of urban life directly affects the physical environment. "Synomorphy" also refers to the shared characteristics between an individual and their environment, and these characteristics arising from cognitive harmony can be positive or negative depending on the quality of the environment. In other words, synapomorphy refers to how well an individual fits into their surroundings' behavioural and thought patterns [16]. Some private spaces within residential interiors and landscapes outside production areas can be examples of this issue. Because these spaces are entirely personalized and changing spaces that are shaped according to the users, these spaces can provide benefits in terms of reading farm users' social, cultural, and physical aspects. While reading about spaces, the critical analysis of the behaviour pattern theory includes the behavioural form in physical space or arrangements [14]. This theory suggests that every point in space will have a physical and semantic value depending on the customization and changes of the space and will create an environment [14]. The pattern of behaviour is essential to explain the reasons for the behaviour patterns that will occur in spaces, which are caused by the physical and semantic parts of the specific space.

Depending on the behavioural pattern, the change of spaces can be discussed in the context of psychology and, therefore, the relationship between perception, knowledge, and behaviour. However, in the context of relationships with place, concepts of place and identity that can be discussed should be examined, considering the relationships related to belonging. Ignoring the socio-economic situation in farms, access to drinkable water in rural areas, provision of personal needs, and many other needs that require remote connection with the urban are critical issues in the context of the relationship with the place in farms. When considering identity-based relationships, examining the connection between place and social identity and the importance of

a sense of belonging is important. Seamon (2003) states, "If a place can provide a sense of orientation and identity both inside and outside, then it is worth investigating how the physical and structured environment contributes to this [17]. ”Regarding identity, a situation affects the relationship between the behaviour, design, and use of spaces. Due to the distance from the city, even the government's emergency services, such as police, gendarmerie and ambulance, take much time to reach farms in case of emergency. That is why various security measures and vehicles in farms can be considered regarding the sense of identity and the spatial relationship between homes. Therefore, Cooper (1976) states, "Social identity and place identity are inseparable parts." In this context, the need for individuals to create living spaces compatible with their social and cultural identities should be examined[18].

2.2.Design of Farm Buildings

Farm buildings have been integral to human civilization since the Neolithic era, and various cultural, environmental, and economic factors have shaped their designs. As anthropologist Setha Low notes, "The farm is the oldest, most ubiquitous, and most meaningful of human environments, and as such, it is central to studying the human condition"[19]. The study of farm buildings from an anthropological perspective offers insights into how people organize their built environment and how it reflects their values, beliefs, and social relationships.

One important aspect of farm building design is its connection to the natural environment. The local topography, weather patterns, and ecological systems often influence the layout and orientation of buildings. For example, in ancient Mesopotamia, the design of farm buildings was closely linked to the region's arid climate and irrigation systems. Farmhouses were typically constructed with thick mud-brick walls and flat roofs to provide insulation from the intense heat, while barns and granaries were raised on stilts to protect crops from flooding [20].

Similarly, in the mountainous regions of Cilicia (Cukurova), farm buildings were constructed to adapt to the steep terrain and harsh winters. Traditional farmhouses (Figure 1) were built into the hillsides and had thick stone walls to retain heat, while the roofs were covered with

layers of earth and straw to provide insulation [21]. These examples illustrate how the design of farm buildings reflects a region's ecological and climatic conditions and how it optimizes the use of natural resources. In addition to the examples mentioned above, the ancient city of Mersin Yumuktepe, located in modern-day Turkey, offers another fascinating example of how farm buildings can reflect a region's ecological and cultural conditions. Archaeological excavations have revealed a complex of agricultural structures, including granaries, storage rooms, and animal pens, that were integrated into the city's urban fabric [21].

Figure 1: Ucayak Villa Rustica in Mountanious Cukurova, (Aydinoglu, 2010)

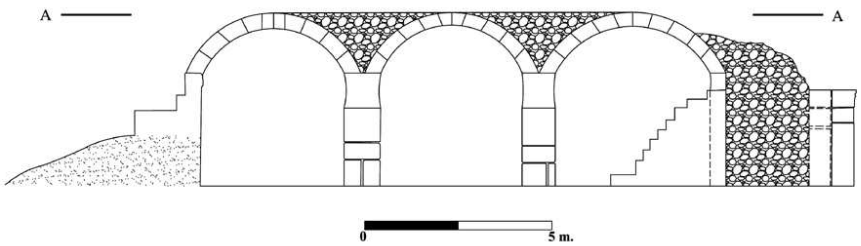


Figure 2: Partial Section of Uc Ayak Villa Rustica (Aydinoglu, 2010)

In ancient Egyptian culture, farm buildings were designed to reflect the importance of agriculture to their society. The temples of ancient Egypt served as both religious and agricultural centres, and farm buildings were often incorporated into temple complexes. The temple of

Karnak, built during the New Kingdom, contained granaries and other agricultural buildings that were essential to the temple's functioning [22].

Figure 3: Temple of Karnak, Blyth, 2006

In Africa, traditional farm buildings were designed to reflect cultural beliefs and practices. For example, the Dogon people of Mali built their farm buildings using mud and thatch and decorated them with intricate carvings and designs. The buildings were designed to reflect the Dogon's spiritual beliefs and were often built in clusters, reflecting the communal nature of their agricultural practices [23].

Figure 4: Dogon Village (Thomas, 2016)

According to the variance of farm building meaning, one critical aspect of its design is its relationship to the social and cultural context. As noted by anthropologist Setha Low, "Farmers not only shape their environment but also are shaped by it. Their buildings embody the meanings and values of their culture"[19]. In many cultures, farm buildings are symbolic representations of the family and community. For example, in ancient Rome, the villa rustica symbolized wealth and social status, and its design reflected the hierarchical structure of Roman society [24].

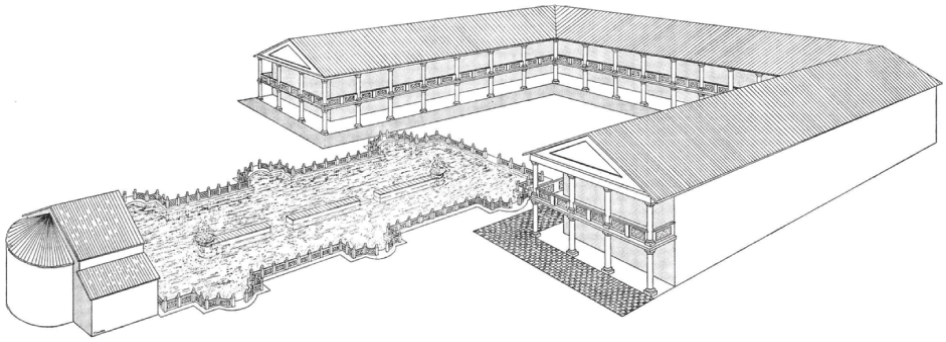


Figure 5: The Roman Villa Rustica, Metraux, 1999

In contrast, in traditional Japanese farming communities, the design of farm buildings emphasized communal living and cooperation. Farmhouses were typically built around a central courtyard, and the layout of the buildings promoted interaction and shared resources among the

residents [25]. These examples illustrate how the design of farm buildings reflects a society's social and cultural values and reinforces social relationships.

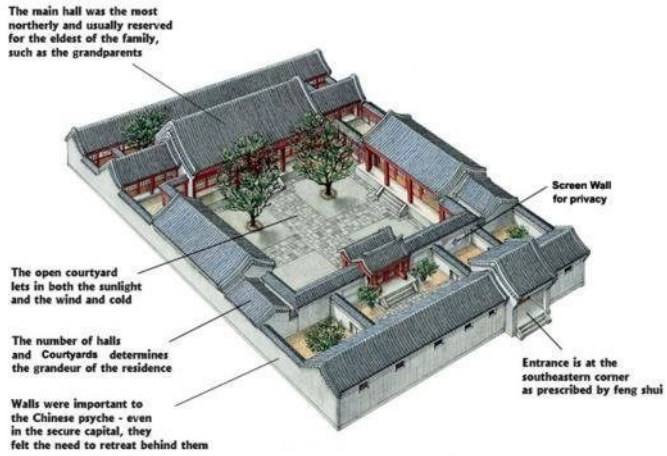


Figure 6: Traditional Japan Rural Housing, Zhang, 2017

Farm buildings differ from other types because of their unique relationship to the surrounding environment. Amos Rapoport notes that buildings are part of the larger context in which they exist and can profoundly impact human behaviour and attitudes toward the environment[26]. Therefore, designing and constructing farm buildings requires careful consideration of their location, orientation, and functionality to ensure their successful integration into the landscape.

One of the significant challenges in designing farm buildings is to create structures that can withstand harsh environmental conditions, such as extreme weather, temperature fluctuations, and pests. The design of farm buildings needs to incorporate elements that address these challenges, such as ventilation systems, insulation, and materials that are resistant to environmental hazards. Additionally, the design should consider the efficiency of energy use and the sustainability of resources, as these buildings are often located in remote areas with limited access to resources.

Another critical aspect to consider when designing farm buildings is the social and cultural meanings associated with them. As Setha Low points out, buildings have cultural significance and are not just physical structures [19]. Farm buildings, in particular, are often

deeply rooted in cultural traditions and practices passed down through generations. Therefore, their design and construction should respect and celebrate their unique characteristics and functions. For example, the traditional farm buildings or ziggurats in ancient Mesopotamia were designed to incorporate the religious beliefs and cultural practices of the people who built them.

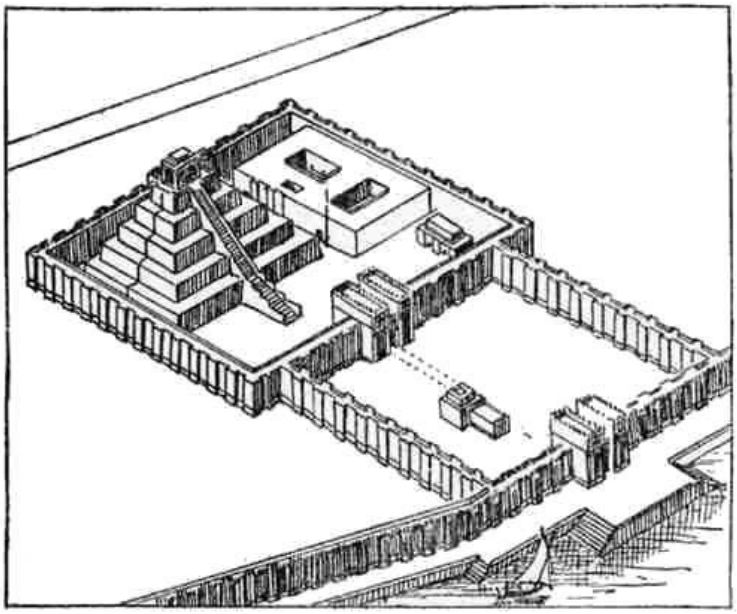


Figure 7: Mesopotamian Zigurat, Handcock, 2014

Moreover, the spatial arrangement of farm buildings significantly impacts the use of space, the flow of movement, and the social interactions of the people who live and work in them. The study of farm building architecture can help us understand how people create and transform their built environments to adapt to changing social and environmental conditions. It also provides insights into how to design more sustainable agricultural systems sensitive to local communities' needs and values.

To conclude, the meaning of farm buildings goes beyond their functional purpose of providing shelter and storage for agricultural activities. They represent the culture, traditions, and values of the people who build them and their relationship with the environment and other people. By analyzing ancient farm buildings from different regions and cultures, we can see how they reflect the social and economic conditions and the ecological challenges of their time.

2.3. Transformation/Evolution of Farm Buildings

In this section, the relationships between the concepts formed by environmental perception, informatics and behaviour-based theories will be examined to understand the change in farms within the scope of environmental design research. According to Alper Ünlü (1998), environmental design research has a structure that includes studies to increase the quality of life between humans and the physical environment [14]. The theories based on perception and behaviour are shaped by the perception of space, its use, human behaviour, or vice versa. Environment shapes human behaviour, usage, and perception. When we examine the concepts of stimulus and stimuli based on cognitive-based theories, environmental cognition includes knowledge and understanding processes [14]. In other words, starting from the relationship between humans and farm areas, a network of conceptual relationships that need to be discussed within the scope of the thesis is formed.

Based on the perception theory, an environment consists of a stimulus and a stimulant. In addition to awareness, perception also involves cognitive information. Perception demonstrates how information is collected and acquired and how cognitive knowledge is organized, classified, and evaluated [14]. Moreover, Henry Lefebvre says, "Space is never empty: it always has a meaning." These areas are never transparent but can be read with accurate information and analysis. In this analysis, social, economic, ideological, and technological factors create the environment [27]. For example, if we know the user's socio-economic and ideological background while examining farms, it becomes easier to understand the environment. Moreover, technology has already changed life on farms and agricultural methods within the last fifty years, compared to the ten thousand years old history of agriculture, and this change is reflected in the environment.

On the other hand, places that hold special meanings to people through their social interactions, conversations, memories, emotions, and dreams can serve different purposes and be transformed from assigned spatial names, as Low (2014) pointed out. It is only possible to read the socio-economic hierarchy in the old farms built before 1950 in Cukurova based on the location of the farm owner's house, but the additional structures built indicate that hierarchical boundaries

have begun to form directly within the farm [28]. Moreover, cognitive processes involve cognitive schemas, perception, knowledge, and thinking processes that emerge as a result [29]. Therefore, due to cognitive schemas that develop and change over time, the collaborative environment in some farms has given way to hierarchical spaces according to users. Thus, cognitive maps can be used to understand the analysis and transformation of space [28]. Therefore, the cognitive schema provides an essential theoretical basis for examining and understanding the uses and changes of farm space.

Lynch (1960) reminds us how some spatial elements, whether at the scale of the city or the scale of architectural space, are remembered more quickly than others, are stored and coded more easily in mind, and emerge to perceptual and cognitive processes [30]. By approaching Lynch's (1960) theory, which talks about landmarks in the context of the environment, from a slightly different perspective, it can be encountered that the areas in the farmhouse or courtyard, which become a landmark at the spatial scale, become the landmarks of the areas with increased syntactical integration value [30]. For instance, in Arab village houses or Japanese farms, there is a circular landscape element to define the house's entrance better. A large door sometimes opens to the courtyard where this element is absent, especially in closed structures with courtyards. The use of this door can be seen in (Figure 8) or circle varies according to the gender of the users, where they will sit, or the house hierarchy [31]. Elements of the farm, such as the owner's house, gates, and fences, serve as important landmarks that help to define the space. Areas that become the landmark of the space itself can be intersections such as courtyards or landscapes that distribute to different spaces, or they can be fixed spaces such as irrigation stations, large storage areas, residences, workshops, porches, or a big tree. Portable elements whose locations can be changed can directly affect the organization of the space, in addition to fixed locations or elements like this. Elements such as various active agricultural equipment, tractors, trailers, tillers, pesticide machines, farm animals, or feed piles may sometimes not have a fixed location. The way the space is used and organized changes because of various factors. That means the farm space constantly changes depending on what is happening and where things are located.

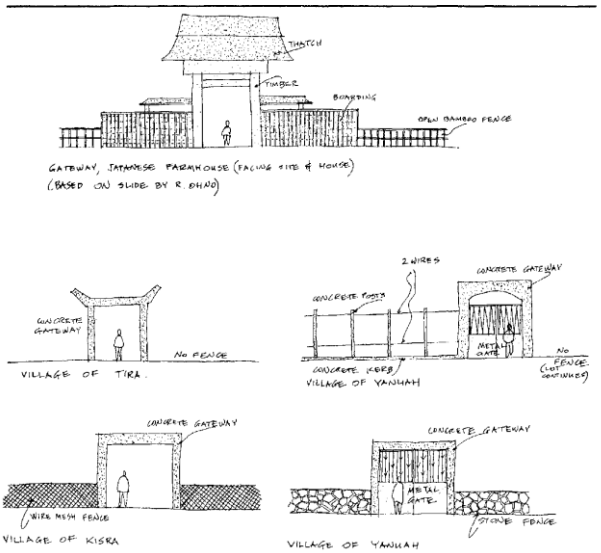


Figure 8: Gateway of Arab and Japanese Farm Houses, Rapoport, 1982

In another dimension of the debate, the sovereignty boundary is related to culture-based theories such as territoriality (psycho-social area), privacy and defensible space. For example, when considering farms as houses with courtyards, Rapoport (2007) says there is generally no privacy concern in the relationship between a courtyard and interior space [26]. However, since the farm space contains both working and private living spaces, it is necessary to refer to theories such as territoriality and privacy areas to explain the contradiction. In this context, cognitive-based theories are closely related to culture-based theories that reveal individual differences. In the cultural approach, individuals or groups know the environment, are aware of and permanently acquire information about the environment they perceive. Still, they do this in response to an environment already given to them. The study focuses on uncovering the reasons, causes, and transformations rather than the social structuring of the environment or farm owners.

As a continuation of behaviour-based theories, it is necessary to consider the relationship of the space with its users to examine the relations related to the development and change of the farm space. In this context, exploring the relationship between place and social identity and the concept of belonging is crucial. Environmental perception and cognition, behavioural patterns, and personal space should be discussed within the scope of environmental design theories. At the same time, theories based on environmental satisfaction and environmental adaptation should also

be addressed. For example, there is a great affiliation difference between Spanish American and South USA farmers regarding the farm's rural location, and there is no socio-economic difference in this distinction. Both farmers are at the top of the hierarchy in their respective regions, so the difference here is related to socio-economic status, lifestyle patterns, and cognitive maps. Spanish American farmers do not prefer to establish a daily life there even if they farm in the countryside because they see those living outside the grid (urban area) as potentially dangerous [32]. After all, nature is not a symbol of development or modernism [32]. Nevertheless, on the contrary, the farmers in the south of the USA love nature and want to live with it; they take the necessary importance with their dogs and gun and establish their place where they do their agriculture. While examining the effects of cultural and social differences on identity from here, the relationship between functional changes in the context of space and sociocultural changes is significant.

The potential changes in the spatial organization during the transformation of farms, such as the specialization and increased importance of specific spaces, their integration into cohesive areas, or conversely, the shallower arrangement of spaces in terms of space syntax, highlight the necessity of examining the relationship between semantic relations and space syntax together. The change in construction technologies can be considered an essential factor during the investigation of the morphological change of the spaces of the farms. At the same time, this change should also consider the technology used in agriculture and its functional change due to sociocultural change.

2.4.Space Syntax

Space syntax includes all representation, measurement, and evaluation techniques to describe and analyze the relational and configurational features of the built environment [7]. This method, which is used to analyze spatial configurations, predicts understanding and analyzes the relational structure of the spatial system. The Space Syntax method researches a new framework to comprehend, discuss, and express space. This spatial analysis method and evaluation of the built environment focus on the relationship between people and space. This method involves

examining the structure of the space from various perspectives and assessing it through quantitative abstractions. The starting point is that humans see space as a key and necessary resource to organize themselves [33].

Studies to analyze the space are efforts to understand and interpret the complex structure of the space. Spatial orders shape the movements of the people living in them and the relations between them. Space syntax is utilized to analyze spatial characteristics and inter-space relations at the building and settlement scales. Both scales investigate the principles of organization and functional concerns in systems formed by houses, streets, squares, or similar elements such as rooms, halls, and courtyards.

Usability analysis is a method of analysis that focuses on how easily people can move within a system in studies conducted with space syntax. The aim here is to present spatial models in a concrete form using a graphical language, drawing upon fields such as topology and mathematics. Computer-based measurements then analyze the collected information. Here, instead of the features of spatial structures such as form, scale, and texture, the focus is on their positions in the whole and their relations with all other spaces in the system, and it is aimed to analyse these features analytically. In addition, it would be a deceptive definition to say that human hands make buildings appear in their purely physical condition [34]. It can be said that space syntax can provide a versatile benefit to being able to read the situations behind the physical appearance of buildings. The purpose of buildings is to bring an arrangement to the space, in short, to enable it to be considered together with the concept of order, to get the spaces together [7].

Space syntax techniques in architecture are beneficial for understanding the nature of designs. It can also be said that it is a helpful reading method for understanding the relationships, common points, and differences between similar structures and all of them cause and effect. Thus, it can be determined how the designed spaces are used by the people living and moving in them. In other words, buildings express social meaning with their appearance and planning. The space

syntax theory tried to show this social relationship by considering the physical connections of space [7].

2.5.Space Syntax in Farm Design

This section introduces definitions to help understand farms' organizational and social structure and presents the theory of space syntax on an architectural scale. Social and functional meanings shape the relationship between spatial form and human action. People are located in physical environments such as bedrooms, kitchens, and living rooms, and they categorize these spaces with names, impose meanings on them, and act according to these meanings. Although this naming gives sense to the space, it helps to evolve the place in question from an anonymous space to a place that reflects the expectations and values of people [35]. Space syntax theory's applicability in architectural design has become an inspiring field, especially for researchers carrying out studies within the scope of environmental and behavioural approaches.

In architectural scale research, the space to be analyzed within the scope of any study is considered an environment consisting of a composition of different parts in the 2-dimensional plane. For example, the particles that connect the urban space components are the streets or spaces that connect the farm space elements and form the farm's circulation system within a horizontal orbit.

The regulation of relations between spaces in buildings is mainly related to the order and hierarchy between farm users' relationships. Users have entered the form and fundamental nature of buildings. Buildings are important visual symbols of society with these situations [7]. The systems of spatial relationships are also important together with the objects used.

According to Klarqvist (1993), when analyzing a space, we can consider the entrance section as the starting point and examine the connections between different areas to determine the number of spaces needed to reach any given space [36]. That can help us identify the space's deepest and most shallow areas. In justified graphs, the lines connecting these spaces visually represent the number of syntactic steps required to move between them. By examining the spatial

components of the layout at different levels, we can gain a deeper understanding of the overall depth and structure of the plan. Clarqvist (1993) suggests that this approach allows us to compare different plan schemes and identify similarities and differences.

The concept of the connection state of space, when viewed from its entrance section, has been discussed in previous research [36]. This concept provides valuable insights into the spatial organization of a building or design by determining the number of spaces that need to be passed through to reach a location and identifying the deepest and shallowest parts of the space. Justified graphs can represent the syntactic steps required to move between spaces, providing depth-level data for the plan scheme at different levels. This analytical approach enables the comparison of different plan schemes and abstract forms, aiding in identifying patterns and best practices in spatial design. This relationship expressed as integration value also offers the integration values of other nodes in the most isolated node and a using frequency rating [7].

Deep spaces and the software used for space sequence analysis are expressed in cold colours, and shallow spaces are expressed in warm colours in the graphs. The integration value is critical data for researchers working in architectural design due to its predictions and tendencies about the social context of the space [37]. It provides more sensitive and subtle data in the space sequence and provides the concept of a grid. Although spaces relate to openings such as corridors and doors, this connection may be blocked by separators such as landscape elements and furniture. The analysis of how grid pieces, which help us to examine the spaces in themselves, have a relationship with other grid pieces just adjacent to the other grid pieces reveals the isovist structure of the given plan and the accessibility structure of the plan by taking into consideration the sequence height [37].

On the other hand, isovist is a term that refers to the information that helps us understand a particular space from an internal perspective. It considers an individual's perception of the space, their visual interactions with it, and how their perception changes as they move around. With comparable field data, a researcher can see a position within the space from any point, providing a 360-degree view [38]. Benedikt (1979) defined six quantitative measurements of isovist: isovist

area, perimeter, drift, occlusivity, compactness, and occlusivity [39]. Two of which are the isovist area value and isovist perimeter value.

In order to obtain meaningful quantitative data regarding the overall configuration of a space, it is necessary to collect multiple stimulus data that can uncover an individual's interactions and perceptual experiences within that space. We can better understand the space by examining the relationship between these data [40].

As a part of the study, we determined that not all space syntax parameters would yield meaningful results. Therefore, we focused on using parameters appropriate for architectural scale that we have encountered in farming or that can be interpreted. Below, we will explain these parameters in order, including their theoretical meanings and how they will be utilized;

This study aims to identify the spatial hierarchy, most active areas, and specific/general areas on farms using syntactic parameters that will be measured and analyzed. Validating the hypothesis of a common change requires comparing all farms' preliminary and existing states. This study also aims to open new discussions from various perspectives regarding difficult situations that are hard to detect with observation methods on farms, in line with their quantitative data and parameters. Our dataset includes over a thousand data points, including 26 plans, ten parameters, and numerous spaces, resulting in over a thousand numerical data points. We aim to use this numerical data to clarify systematic changes and trends in the locations studied.

On the other hand, there may be cases where space syntax alone is insufficient to understand the farm and its transformation or to interpret quantitative data. For this, it will be essential to resort to cognitive-based theories and conduct a parallel analysis in the light of syntactic data to read the observed traces and syntactic data on the farm. For instance, theories such as "privacy," "territoriality," and "defensible space" have greatly influenced the understanding, design, and modification of space in architecture and provided an opportunity to evaluate 2D plans from different perspectives. Additionally, Altman's regulatory mechanism (1975) reveals that the form of space determines the interaction between individuals [41]. According to space syntax theory, individuals are expected to act following their needs and

safeguard a well-defined area [42]. However, a cognitive-based approach is insufficient to understand the social logic of space [7]. Quantitative and qualitative theoretical methods may support each other in examining farms. Kaplan's (1987) studies stand at a turning point that emphasizes the relationship between IT-based theories and the physical environment to understand them [43]. Kaplan's studies have shown that the physical environment can significantly affect individuals' behaviours and psychological well-being. Understanding the complex and multidisciplinary relationship between the physical environment and human behaviour on farms requires combining environmental theories and fieldwork research.

One related study on identifying the genotype of farm buildings used Space Syntax to analyze [44]. In this study, historical maps were used to reach the original spatial scheme of the farms comparatively. The study also described the typology of the farms using the spatial organization types of Hillier and Yang (2019) [45]. Hillier and Yang's structured types have revealed four types: Star (Type-A), Path (Type-B), Cycle (Type-C), and Wheel (Type-D), which are shown below. In Nes' operation, all three types of structure except for Type-D were observed in farm structures. This difference is associated with the positioning of landscape and building groups. According to Nes, there have been architectural and ethnographic studies on these farms, but in past studies, ethnographers focused on daily life dynamics, forms, and materials used in architecture. Thus, Space Syntax intersects these two work methods and fills the gap. The study's results revealed how the interior was used in the past and its hierarchical relationship with the farm environment.

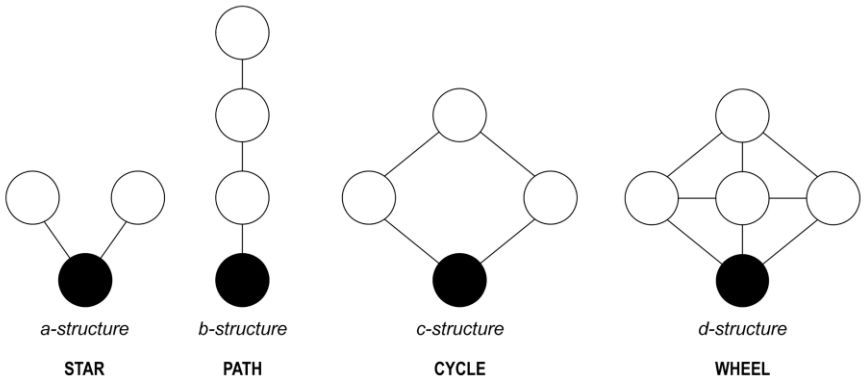


Figure 9: Structure Types, Hillier & Yang, 2019

Other farm structures include the syntactic work on Hillier and others on 17 farmhouses in France. This methodical study aims to understand the genotype of Space Syntax's genotype in a specific definition. The study consists of three parts. The first part aims to understand the systematic structure of the farms in the figure below. Figure 1 shows the orientation, spaces from the entrance façade, and neighbouring elements of the main structure. Then, the justified permeability graphs of the farms and the syntactic integration values tables were removed. Finally, a comparative analysis was made. Hillier mentions a typology problem here because phenotypic, functional, and irrelevant 17 farms do not make it possible to compare the collective comparison. As a result of the study, the dominant two genotype was reached. These strong tendencies in the samples prove an underlying spatial culture that expresses itself through the spatial form of houses. This spatial culture emerges despite the numerous comparisons recorded in the home-house examination [46]. Therefore, Hillier (1987) says that more than one genotype can be defined as an indicator of spatial cultures and more powerful.

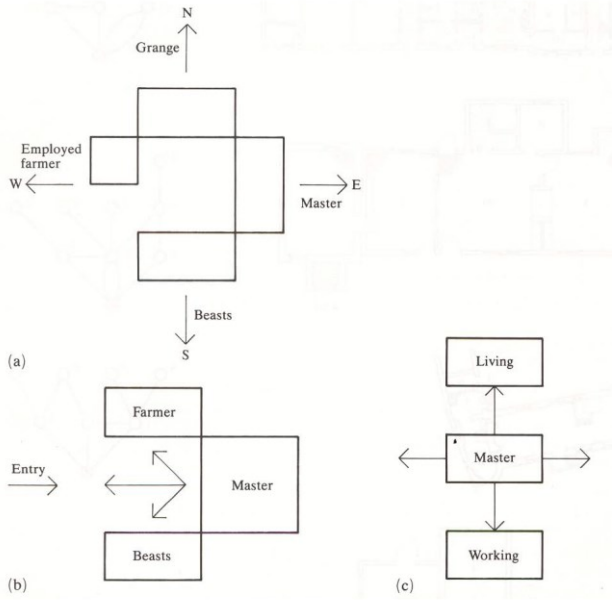


Figure 10: Three elements of a model of a farmhouse: (a) orientation, (b) frontalité, (c) lateralite, Hillier, Hanson & Graham, 1987

2.6. Chapter Results

This chapter discusses the importance of studying farm building architecture to understand how people adapt to changing social and environmental conditions and to design more sustainable agricultural systems. The chapter explores farm building typology, the transformation/evolution of farm buildings, and the theory and method of space syntax in farm design. The document also includes case studies that use space syntax to analyze the genotype of farm buildings and understand the systematic structure of farms.

The chapter emphasizes the relationship between organisms and their environment, a central concept in ecology-based theories and particularly relevant in the farm space. The geographical and ecological factors that shape the landscape, such as climate, topography, and soil quality, are critical determinants of agricultural productivity and sustainability. The layout of a farm is influenced by various factors, including production methods, technological advancements, and organizational structures, which are all interconnected and affect the ecological balance of the surrounding environment. Therefore, integrating ecological principles,

geographical knowledge, and technological innovations is crucial for understanding the farm space.

The chapter also discusses the importance of cultural and social meanings associated with farm buildings. Farm buildings are often deeply rooted in cultural traditions and practices passed down through generations. Therefore, their design and construction should respect and celebrate their unique characteristics and functions. The spatial arrangement of farm buildings significantly impacts the use of space, the flow of movement, and the social interactions of the people who live and work in them.

Furthermore, the chapter highlights the importance of using space syntax techniques in analyzing farms' organizational and social structure. Space syntax techniques in architecture are beneficial for understanding the nature of designs and the relationships between similar structures. By using space syntax, it is possible to analyze the relational and configurational features of the artificial environment and understand the relationship between spatial form and human behaviour.

In conclusion, the chapter provides valuable insights into the importance of studying farm-building architecture and using space syntax techniques to understand the systematic structure of farms. By considering the ecological, social, and cultural factors that shape the farm space, we can understand how it transforms and evolves in response to changing social, environmental, and agricultural conditions.

CHAPTER III

FARM BUILDINGS IN CUKUROVA

3.1. Cukurova

Cukurova refers to the plains within the borders of today's Mersin, Adana, and Osmaniye provinces, as perceived by today's people. However, during the 1st Turkish Geography Congress held in 1941 under the presidency of Hasan Ali Yücel, there was conceptual confusion regarding the name Cukurova. Herbert Louis presented to Congress "Some Principles of Turkey's Geography(I. Türk Coğrafya Kongresi)" the word Cukurova with the Adana Plain. Still, it distinguishes it geomorphologically with the area where the Misis Mountains are located in the east and calls the other eastern part the Ceyhan Plain. The term "Adana Plain" in this congress comes from the division of the Mediterranean Region into Adana and Antalya in the same congress. According to Serdar Girginer, who conducted valuable archaeological research in the region, it is appropriate to use the term "Adana Plains" for the entire plain area [1]. However, in this thesis and future articles, the term "Cukurova" will be used for the entire plain area, as it corresponds to the usage of today's society.

The Cukurova basin is flanked by the Taurus Mountains, a range that extends in a northeast-southwest direction from Adana to Mersin, with the Misis Mountains surrounding it in the southeast. The basin descends from the mountainous part in the north to the hills and the Adana plain in the south. The plain area covers almost half of the basin [47]. The streams in the basin pass through deep gates (valleys) in the Taurus Mountains' calcareous terrain and are mainly fed by snow, spring, and rainwater [47]. That has been essential in making the region suitable for agricultural production.

The principal rivers in the region are the Seyhan, Ceyhan, and Tarsus streams, flowing from east to west. Ceyhan River takes its tributaries from Kahramanmaraş and its surroundings.

The branches of the Seyhan River also extend to the vicinity of Kayseri, and the Tarsus stream starts from the Taurus Mountains. The region's borders are generally a delta formed by the accumulation of alluvium brought by the Seyhan (Saros) and Ceyhan (Pyramos) rivers in the depression areas seen in Fig. 11.

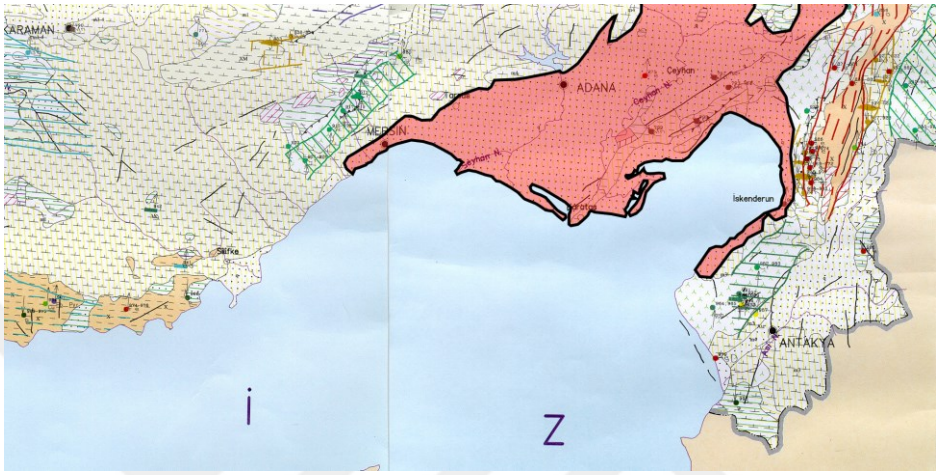


Figure 11: Highlighted Cukurova Basin Map, Turkey Mineral Tektite Exploration Agency, 2022

3.1.1. Brief History of Cukurova

Throughout history, many states were established by Akkad, Egypt, Mitanni, Hurrian, Babylonian, Hittite, Persian, Greek, Roman, Byzantine, Crusaders, Armenian, Arab, Mongolian, and Turks in the region [1]. The oldest known name of Cukurova is Kizzuwatna, dating back to the 2nd millennium BC [1]. Cilicia was first encountered in Hittite texts during the 16th century BC [48].

Archaeological research in Gözlükule, located in the town center of Tarsus, indicates that the first settlements in the city date back to about 7,000 years ago [49]. Additionally, "Yumuktepe" excavations in Mersin have revealed that the first settlement in the region dates back to 7000 BC. The excavation's topmost layer structures show that the Hittites were the first civilization to settle in the region.

The region changed significantly after the Romans arrived and accepted Cilicia as a province. Urbanization began to spread throughout Cilicia, starting from a settlement in the valley between the Göksu and Limonlu rivers. Military buildings and towers were constructed to protect

against pirate attacks. Unlike the Hellenistic cities, which were surrounded by walls or in hidden mountainous areas, Roman cities were settlements with civilian structures such as collonaded streets, theatres, agoras, and aqueducts along the coastline where security was provided.

Throughout history, the plains of Cilicia have been home to famous and vital cities such as Tarsus, Adana, Misis, Anazarbos (Anavar), and Aegae (Yumurtalık) [50]. Nowadays, these old urbanizations are primarily agricultural regions. However, due to Arab raids starting in the 7th century, many cities in the area were destroyed, and the population decreased [1]. The Byzantine Empire dominated the region from the 10th century and witnessed significant developments during the Crusades (1095-1268) [50]. The Armenians, who took refuge in the Taurus Mountains during Arab-Islamic and Turkish raids, took advantage of the Crusades to conquer the region (1080-1375) and established an Armenian kingdom called "Little Armenia" [51]. Many Armenian structures in Tarsus have survived to the present day. Since the 14th century, the Ramazanogulları have dominated the region. The Ramazanoglu Principality, which ruled the area until it came under the auspices of the Ottoman Empire in 1517, was also connected to the Mamluks operating in Egypt from time to time and received significant cultural influences from them [51].

In summary, the Cukurova region has been home to many civilizations and cultures, each leaving its traces there. Due to its geographical, climatic, and agricultural advantages, Cukurova has hosted many civilizations and has been a point of attraction.

3.1.2. Ancient Farm Structures in Cukurova

Unfortunately, information on pre-republican agricultural structures in Cukurova is limited to a few Ottoman-era records and their use and classification during the War of Independence. However, urban archaeological settlements and villa rusticas from the Roman period provide some insight. The oldest agricultural structure found, dating back to the Neolithic period and still in existence today, is the Mersin Yumuktepe archaeological site. Agriculture was also practised, and storage areas were present in the Gözlü Kule archaeological site in Tarsus. However, no similarity to modern-day structures has been detected typologically or in terms of use, unlike

Yumuktepe. The farm structures (villa rustica) dating back to the Roman period are the most valuable archaeological sites for comprehending the regional plan. Numerous agricultural villa rusticas can be found in the sloped areas stretching from the West Cilicia Mountains, west of Mersin, to Anamur.

Due to its high agricultural productivity, Cukurova has been home to agricultural communities for centuries. The region's adaptability to agriculture has allowed farming to be sustained since the Neolithic Age. As a result, agricultural technology and irrigation networks are more advanced than in other agricultural regions of Turkey. One of the most significant pieces of evidence supporting this is the Yumuktepe, the oldest human settlement in the region, which will be discussed in this thesis. However, before discussing Yumuktepe and its use, mentioning the 2014 study conducted by Aydın, Gasco, and Çetintürk on courtyards in ancient Anatolia is essential. Their research systematically categorized the use of courtyards in Anatolia, as shown in the figure below [2].

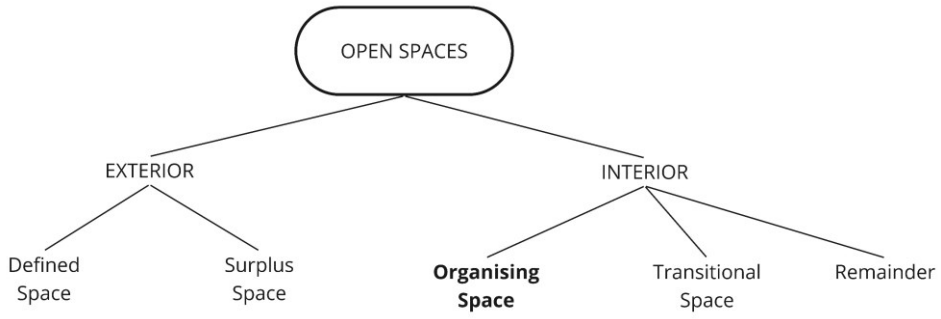


Figure 12: Courtyard Types, Aydın, Gasco and Cetinturk, 2014

They explain the concept of Organising Space as follows: The 'organizing space' category within building interiors refers to an inner courtyard or spatial element that coordinates connections between different spaces. This element is crucial in the layout of a building as it determines the arrangement and disposition of all rooms, as seen in Fig. 13 . A central courtyard is also necessary for easy access to all units and transition from exterior to interior [2]. From this, we can understand that if the courtyard serves as an organizing area for all other functions, it must

have the same functional structure as the courtyards of all case farms within the scope of work. As seen in the figure below, it can be read in the plan of the Yumuktepe area. Until another older archaeological site is found, it would not be wrong to say that the functional origin of the courtyard in the farm structures in Cukurova is the first example and originated from Yumuktepe for the whole world. According to Aydın and others(2014), the development of this typology is an ancient knowledge product that originated from Mesopotamia [2].

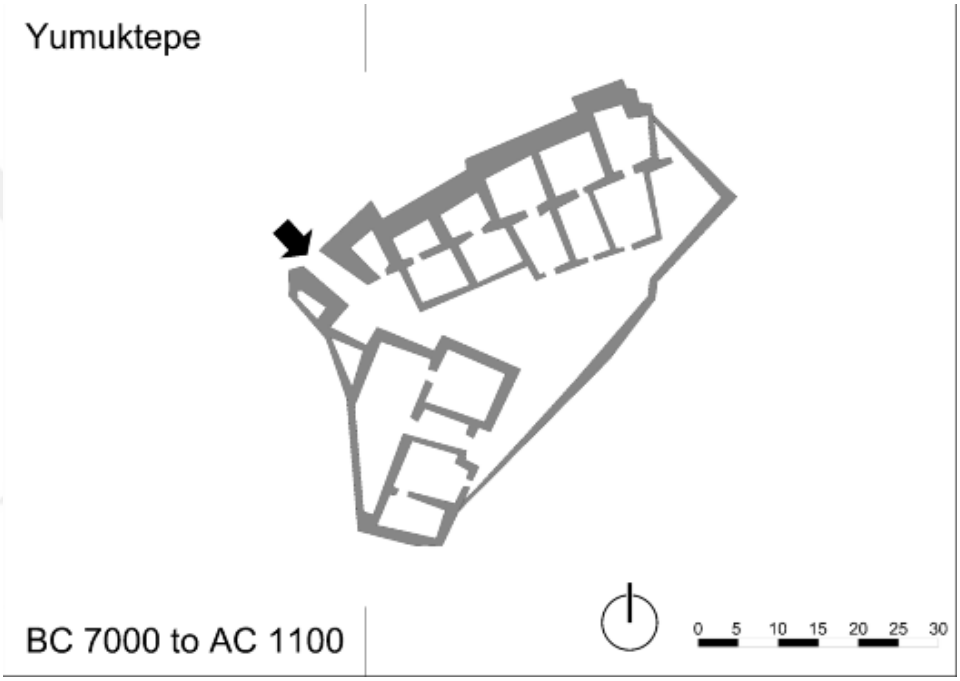


Figure 13: Yumuktepe Archaeological Site (Aydın et al., 2014)

Furthermore, it can be noted that the surviving archaeological villa rustica (Roman farm building) from the Roman era are the closest examples we have to modern-day farm structures. It is possible to use archaeological studies and ancient Roman sources from the region to explain the long-standing function and typology. The tradition of villa rustica buildings came from a need to be close to farmland. The tradition of building agricultural buildings indeed arose out of a need. These settlements must have emerged to reside near agricultural land to control the produced product, process and store it on-site, and protect it. The word "villa" is a Latin term belonging to Latin culture. This term describes a place designed and planned for agricultural activities. The structures that emerged as a regular plan during the Roman period

were called "villas." It is not possible to describe villa typology as a fixed term. Villas undergo development, destruction, rebuilding, changes in function, and various transformations, leading to the emergence of local variations [21]. The long period of peace and stability during which the Roman Empire was established also affected the economy. Villas of agricultural origin developed and increased in terms of their plans and functions [52].

According to ancient sources, villas were a Roman creation, consisting of both a farm villa (rustica) and a luxury villa (Urbana) [53]. Their main features are the atriums they take from city houses and the broad "porticus" that opens outward, as shown in Fig. 14. These villas can be divided into winged corridors, courtyard, basilica-style, and numerous others. The term villa is probably new in Cato's time, but Cato provides clear definitions of farm settlements. He says, "If possible, the farm should be on the side of a mountain and its southern face. There should be sufficient water sources and worker support. It should be near a settlement, the sea, a river suitable for transportation, or a busy road" [52]. Ancient sources in the Mountainous Cilicia region to the west of Mersin describe villa rustica archaeological areas in the fields defined by Cato [54]. According to Cato, the plan of the villa should include storage buildings, stable spaces for animals, wine and oil presses, and other functional spaces. Cato summarizes the development of villas by saying that in the past, essential parts of farm settlements were kitchens, stables, and cellars for wine and oil, but now luxury dining rooms have come to the fore [52]. The buildings analyzed in Aydinoglu's studies in Cukurova also show similar features to those in ancient sources. Generally, their plan diagrams are rectangular and have defined entrances. If the farm owners live on the ground floor, they can climb onto storage structures that look like towers to see the whole farm. If the farm owners live on an upper floor, their homes are usually at the top of a slope with a view of everything [54].

Figure 14: Villa Rustica Illustration (Mandal, 2020)

Like today's farm buildings, villas were also built in rustic styles with structures such as wells and cisterns at the centre of their courtyards [21]. In addition, the villa owner lived with workers and animals in a simple building. Still, with increasing abundance, the growing social distinction and development of the agricultural upper class began to separate the living areas of farm owners from their working buildings, and the buildings of enslaved people were much smaller than working buildings [21]. The difference in social status between farm owners and workers during the Roman period, as mentioned by Aydınoğlu, is also evident in the architecture of modern-day farm buildings. Villas in ancient sources are Roman creations, consisting of both a farm villa (rustica) and a luxury villa (Urbana) [53]. Villa Urbana is a situation of moving urban comfort to the rural area. Again, in today's farms, it can be seen that the living areas of farm owners with two or three rooms have been expanded or rebuilt with additions to bring urban home comfort to the rural area. The ancient writers mentioned in the previous paragraph emphasize the importance of drinking water sources and irrigation water for villa rustica, which is probably an agricultural structure [52]. Therefore, today's farm buildings are concentrated in the plains rather than the sloping areas, as in Cato's definition. While irrigation water can be easily obtained from

the slopes, labour is more complex and expensive in sloping areas. Today's technology allows us to use irrigation canals and groundwater instead of difficult labour on slopes. It is also clear that plains are more productive lands.

To conclude, our study reveals that Cukurova has a rich history of accumulated knowledge. Despite the many civilizations that once thrived in the region, natural and artificial catastrophes have caused many farm buildings to be lost. Nonetheless, a few examples of farm buildings from the last millennium remain. Although a significant historical and chronological gap exists between the existing farm buildings and the archaeological farm ruins, we can observe several typological similarities. While we cannot conclusively prove direct relations due to limited cases, we remain confident that the accumulation of historical, cultural, geographical, climatic, and agricultural impacts has shaped the Cukurova farm buildings.

3.1.3. Climate and Natural Vegetation in Cukurova

Understanding the relationship between climate and vegetation is crucial for studying temperature, precipitation, and vegetation in plain land. Such understanding can aid in developing appropriate farm architecture and sustainable management practices in the region. By examining the climate factors and natural vegetation characteristics of the Cukurova region, we can gain insights into designing resilient farm architecture for varied climatic conditions. These insights can help farmers make informed decisions about planting and harvesting, selecting suitable crops and irrigation practices, and designing farm buildings and infrastructure that can withstand the region's climatic conditions. Ultimately, this can contribute to the local community's economic, social, and environmental well-being.

The Mediterranean Sea heavily influences the temperature in the area, creating low pressure due to the surrounding mountains and impacting temperature and precipitation [55]. Altitude differences between the plain and mountainous areas contribute significantly to climatic variability, resulting in different conditions at very close distances [56]. The plain has a typical Mediterranean climate with hot and dry summers, and warm and rainy winters, while the

mountains, valleys, and distance to the sea can cause significant variations in climate. In this chapter, we focus on the average temperature, precipitation amount, and general vegetation characteristics in plain land, which provide valuable insights into the relationship between climate and vegetation.

The temperature values of the region also vary in coastal, plain, and mountainous areas. The average annual temperature on the coastline is between 20°C and 25°C at an altitude between 0 and 500 meters. In winter, temperatures over five °C are observed at altitudes of up to 500 meters, compared to January, when the lowest temperatures are seen [56]. Agricultural lands decrease as one goes above 500 meters.

The average precipitation also varies widely in coastal and mountainous areas, with nearly half of the precipitation falling in winter and the remaining in spring. Although snowfall is rare in areas up to 1000 meters from the coastline, it is present at higher levels from November to the end of April. Since summer and winter make reaching underground and surface water resources possible, agriculture in the region continues in both seasons.

The seasonal winds, influenced by pressure on the Taurus Mountains and the Mediterranean, play a crucial role in the region's climate. In January, especially in Mersin and Adana, the prevailing wind direction is from the northeast and northwest. In summer, the prevailing wind direction is southwest due to the tremendous low pressure the Mediterranean creates. With the decrease in the temperature value of the mountainous mass, especially from the end of August, the wind comes from the southwest during the day and from the north and northeast at night.

Due to these climatic features, Cukurova has been one of the most suitable areas for people to settle in the past. However, cutting down forests, which originated with the Assyrians and continues to occur today, leads to the depletion of plant life [57]. Despite this, the region contains Anatolia's most affluent endemic areas in terms of endemic species. The Taurus Mountains and Amanos Mountains, located in the north of Adana, are the regions where the

richest endemic diversity of Anatolia is seen [57]. Archaeological finds reveal that wheat and corn were cultivated in areas close to water for many years in the region [57].

For this reason, forest areas on the river banks can be destroyed to expand agricultural lands, and these areas are still used as agricultural land today. The fact that the region is close to the Egyptian and Mesopotamian civilizations, which were the dominant power in historical times, and that these civilization centres are poor in terms of forest and vegetation are the main factors that initiated the destruction. İbrahim Pasha, who occupied Cukurova between 1832 and 1842, seriously damaged the forest in the Cukurova plain for the Egyptian navy [58]. Kotschy, who passed through the region in 1858, describes the existence of oak forests around the Ceyhan River and up to the Iskenderun Bay [59]. Today, these regions have extensive agricultural lands.

The Cukurova region is generally studied within the Mediterranean-South Anatolian vegetation zone, extending to the Taurus Mountains' foothills. Wet winters and dry summers affect the life of plants. Especially the lack of precipitation causes the plants in the region to become xerophytes (desert plants) [60]. These climatic conditions and characteristics allowed the maquis formation to develop and spread in the region. The pine trees seen on the slopes of the Taurus Mountains indicate that the scrub vegetation was formed as a result of the destruction and that it is a secondary formation. In areas where the ground is moist in the region, the length of the maquis can reach up to two meters. In the areas surrounding the plain, where the land belongs to the Pliocene and Pleistocene epochs and is pebbly and permeable, the maquis formation is limited in size and strength. Plants in the garage (furigana) formation are common, such as thyme grass, tree heather, and kermes oak, which have thorny, small-leaved, and thick-stemmed structures [60].

According to Göney (1976), the Maki formation was once present in the northern regions of Mersin and Tarsus, where red pine trees descended to the edge of the plain [58]. The plain had rich vegetation, including gum tree, maple, oleander, olive, and wild myrtle plants. However, agricultural and other human activities have significantly damaged the natural vegetation, resulting in the disappearance of various plant species such as rosary, carob, and poppy in the

plain. In the past, the region had rich vegetation that provided herbal raw materials for various purposes, such as producing animal medicine, making furniture, tools, and baskets, and obtaining spices. The human-plant relationship is evident in many ethnographic examples in the region, such as the use of madder in dye production (Karatepe Kilims) and human production from mountain rotting grass. Thus, the study by Göney (1976) highlights the vegetation richness and wide variety of uses by humans in the region [58].

As a result, the water resources and rich vegetation in Cukurova have made the region a centre of attraction throughout its history. These cases show that the first settlements in the region were for agricultural purposes.

3.1.4. Agricultural Production in Cukurova

Despite its centuries-old tradition, there have been significant agricultural changes in Cukurova over the past fifty years. In this thesis, while examining the changes in farms, it is essential to note that the transformation in agricultural production has been one of the most influential factors affecting spatial changes. As agricultural production is one of the underlying drivers of social, economic, and behavioural changes, this section will discuss the production changes in Cukurova.

A variety of factors has driven the change in agricultural production in Cukurova. In the past, agricultural production in the region was mainly subsistence-based, with farmers growing crops for consumption and local markets. However, with new technologies and improved irrigation systems, commercial agriculture emerged in the region in the 20th century [61].

One of the most significant changes in agricultural production in Cukurova has been the shift towards cotton production. Cotton has been grown in the region for centuries, but only in the 20th century did it become the dominant crop [61]. Especially before the 2000s, cotton production required much labour due to the shortage or absence of cotton harvesting machines. In particular, where cotton was produced in the past, farms had standard spatial functions such as multiple lodgings, large kitchens, and dining areas. The increase in cotton production during these times brought changes in market demand, along with the rapid growth of the textile industry in Turkey and abroad [62]. In the early 2000s, cotton accounted for more than half of the total agricultural

land use in the region and was a significant export crop for Turkey [61]. However, the rate is decreasing yearly, and farmers are planting fruit orchards, especially citrus groves, where they used to grow crops like cotton.

In addition to cotton, the production of citrus fruits has also changed significantly over the years. In the past, citrus was grown primarily for local consumption, but today it is a significant export crop for Turkey [62]. Changes in market demand have driven this shift as the global demand for citrus fruits has grown [63]. Production of cotton and other field crops is more suitable for the conditions of the time, as irrigation is not continuous like in orchard plants. However, it can be said that the irrigation canal network, which started to be built at the same time as the Ceyhan Dam in 1961 and the Berdan Dam in 1975, initiated a transformation in the region with continuous irrigation infrastructure. In addition, the government's financial support for orchard agriculture, the establishment of many fruit export and packaging factories in the region, the decrease in cotton exports and the strengthening of China and America in the cotton production sector are also essential factors.

Other crops, such as fruits and vegetables, have also undergone significant changes in production over the years. Adopting new production technologies, such as improved seeds, fertilizers, and irrigation systems, has significantly improved crop yields and quality [62]. Developing new marketing strategies has also helped farmers better access national and international markets [61].

Despite these changes, agriculture remains a crucial part of the region's economy, providing employment and income for millions of people [63]. However, these new job opportunities do not apply to fields and gardens because the decreasing agricultural workforce due to developing agricultural technologies has created a new job field for processing agricultural products. One of the primary spatial changes on farms is the decreased workforce and the inclusion of new technological products on farms. As the region develops, it will be necessary for agricultural production to remain sustainable and meet the changing needs of both local and global markets. Understanding how farms are adapting or attempting to adapt to this rapidly changing

and evolving agricultural model will be essential for making production more efficient and sustainable.

3.1.5. Farm Buildings in Cukurova

In this section, we will first discuss what a farm building is in general, what functions it serves, and the common features of farm buildings. Then, we will talk about the characteristic features of farm buildings in Cukurova, how they operate according to different agricultural production models, and the meaning of the farm building.

Firstly, Sabri Oran (1961) defined the farm structures in Turkey as follows: The establishment and construction of Turkish farmer's houses constitute the role and meaning of agricultural production, and families operating there are the building blocks of the farm and agriculture in Turkey [9]. In other words, as stated by Onan (1961), the element that constitutes the farm space is the whole of structures that emerged with the needs of agricultural and animal products produced there [9]. Otherwise, it would not be easy to distinguish between a rural house and a farm. In addition, Onan (1961) states that geographical location and climate conditions are the most critical determinants in the farm's morphological, organizational, and structural materials [9]. In this sense, he divided Turkey into seven central regions;

A. Central Anatolia Region

B. Southern Anatolia Region

C. Aegean Region

D. Black Sea Region

E. Northeastern Anatolia Region

F. Southeastern Anatolia Region

G. Marmara - Thrace Region

Figure 15: Turkey Agricultural Regions Map, Onan, 1961

Within the scope of this study, it is possible to include Cukurova in the Southern Anatolia Region. Onan's (1961) definition is also generally common in Cukurova. However, besides geographical and climatic differences, other determining factors in defining a farm in Cukurova are whether it is a family or corporate agricultural enterprise, the size of the land it owns, its socio-economic status, and the type of agriculture or animal husbandry it practices [9]. As industrial livestock farming is not carried out in the farms within the scope of the study, we will define the farms in Cukurova through the farms that do agriculture. Since it is boiling in the summer, constantly carrying out livestock farming is challenging to be efficient and sustainable. Therefore, livestock farming is very rare in the region.

Farms in Cukurova mainly consist of the courtyard, house, lodge, storage areas, porch, workshop, outdoor seating areas, and irrigation centre. However, it is possible to list a few more desired depending on the non-common in all farms and especially on the situation where the farm owner lives on the farm. These can be seen in areas such as a poultry house, barn, greenhouse, courtyard kitchen, office, general open sitting area, personal open sitting area and personal landscaping elements such as a swimming pool, pergola, and barbecue area. If the farmer actively lives on the farm, they create new private and common spaces. However, many comfortable spaces are not observed if the farmer only uses the farm as a workplace.

Additionally, in ancient sources, Marcus Terentius Varro made an important statement in Res Rusticae (37 BCE) that complicates the distinction between rural homes and farmhouses

today [64]. In the preface of his second book, he returns to the animal farm that is the subject and states that modern property owners do not work too much on their farms. Unlike their agricultural purposes, villas have begun to serve as summer residences for the rich [64]. One of the most confusing issues when defining a farm in today's Turkey is similar to Varro's observation. One of the places where industrial agriculture production is carried out and where those whom do it stay in the village, and the other is the farms. However, if one produces fruits and vegetables only for their needs in houses used as summer or mountain cottages in rural areas, and if this production does not aim for financial gain, it cannot be considered a farm. The traditional country-style venues are called vineyard houses (bağ evi) in some parts of our country; it can be said that this is more accurate.

Moreover, in Turkey, Ziraat Bank opened an architectural competition in 1954 to demonstrate the importance of agriculture and how the farm should be planned according to the time's sanitary, economic, social, and agricultural conditions. The competition includes separate categories for the seven agricultural regions that Oran (1953) specified. The project images of the 1st selected project in the South Anatolian Plain category are shown in the image below [8]. Climate conditions and prevailing wind directions have determined the layout composition of this project [8]. As in the farms within the scope of this study, the courtyard is the dominant element that can also meet all kinds of needs in this project. Another intense competition related to Cukurova is in the category of mountainous Southern Anatolia. Apart from building materials, the most obvious difference is the lack of a defined courtyard, as seen in the following figure and the lack of need for a courtyard. Animal husbandry is the primary income model in the mountainous South Anatolia. Although there is very little distance between the mountainous and plain areas due to the topographic situation of Cukurova, the agricultural production model and farm usage requirements show significant differences due to geography and climate conditions. Generally, a critical deduction can be made from the competition and results made by Ziraat Bank. Even within an open architectural competition in Cukurova, a building has emerged that deviates

from the prevailing building typology in the region, redefining the concept of farms within its context.

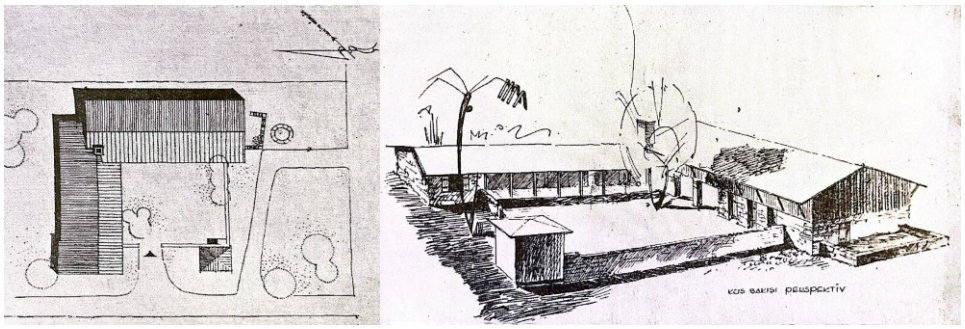


Figure 16: Ziraat Bank Architectural Competition Winner for South Anatolian Plain Area, Architects: Yılmaz Sanlı & Ayhan Tayman, 1954

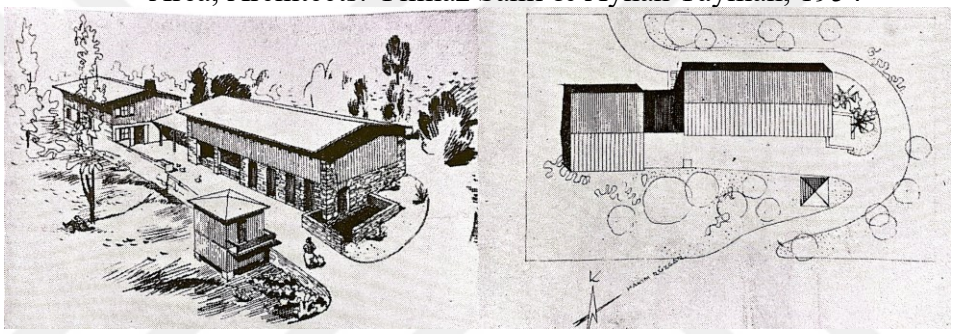


Figure 17: Ziraat Bank Architectural Competition Winner for South Anatolian Mountainous Area, Architects: Yılmaz Sanlı & Ayhan Tayman, 1954

On the other hand, the courtyard is significant in farm space in Cukurova due to climate conditions and agricultural practices. These courtyards are a central space that connects all the areas. Apart from being a connecting space, some agricultural work is also done here. For instance, examples include agricultural product packaging, short-term storage of cereal products, collection areas at the beginning and end of shifts, and utilization during mass events. The farmhouse owner's house is typically visually dominant in the entire yard. Courtyards, including farms, were used for holidays and weddings. The farm owner decided whether to allow such events. The owners were usually wealthy, and the yards offered a more comfortable living space than nearby village settlements. Yaşar Kemal's book "Yılanı Öldürseler" (1976) and his other books set in rural Adana contain many anecdotes about the use of the courtyard on the farm for collective work. Additionally, the Sapandere Farm, which is included in the scope of work, was featured in the film "Dertli Pınar" (1978), and various art fields that appeal to many communities

also included farm courtyards. On the other hand, there are also climatic reasons, such as the need for the farm to be able to receive more open winds due to climatic conditions, as seen in the villa rusticas in Cukurova that have survived from ancient times to the present, and the need for it to be positioned according to the dominant wind direction.

Regarding agricultural production, one common characteristic of all the farms within the scope of work today is that they are family businesses. Onan (1954) prefers the term family farm over farm [8]. Another critical factor is that one needs to have a large amount of land to own a farm or to need one. Onan (1961) defines a small farmer as someone who owns less than 30 decares of land, a medium-sized farmer who owns between 30-150 decares, and a prominent farmer who owns over 150 decares [9]. As described in this definition, all farms within Cukurova and the scope of work serve an area of more than 150 decares. Field crop cultivation is also seen in lands producing over 300 decares of production today. Farm owners likely prefer field crops to reduce their workload since the maintenance of field crops is easier than that of garden plants. Otherwise, all orchard plants in Cukurova provide higher economic income.

As a result, it is not easy to define a farm without considering its region. Defining a farm in Cukurova is impossible without mentioning the spaces' functions, users, and courtyard. Although agricultural products, geography, and climate can be considered subheadings, the agricultural production situation, which changes very quickly in Cukurova, directly and indirectly, affects the farms spatially. Therefore, in addition to climate and geography, agricultural products are one of the contexts that make up the farm space.

3.2. Case Study

This section describes fifteen farms studied in the field as part of a thesis in sequential order. Each farm has unique variables for itself and its users, so it is vital to describe each farm individually to understand them. The complete plans, including fifteen farms and ten old plans, represent the most critical data obtained in the land studies. These plans are visible in the 9th figure below. In

addition to analyzing these farms, this document will highlight their general characteristics, which will aid in the analysis stage.

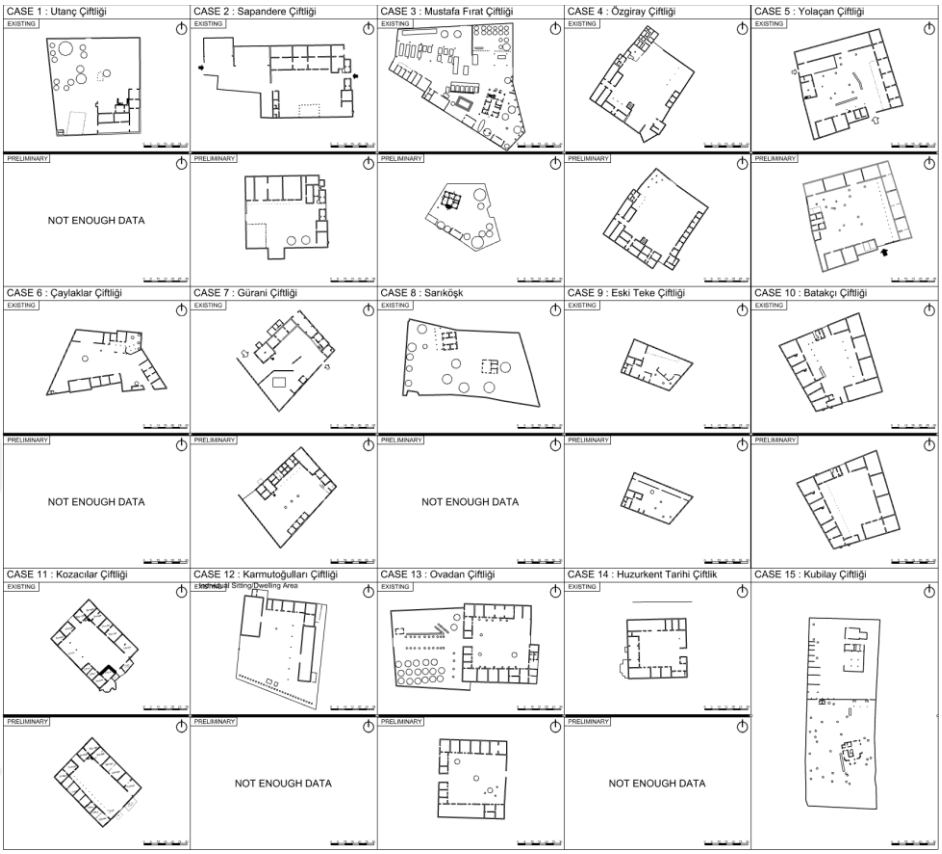


Figure 18: Fifteen Farm's Preliminary and Existing Plans (Firat, 2023)

We will begin by introducing general topics such as the current and old names, location information, known construction dates, and the size of the land the farm serves. While our primary focus will be on the relationships between people and space, we will also explore how location, construction dates, and business size indirectly impact the space. By analyzing these characteristics of farms, we can gain valuable insights from different perspectives.

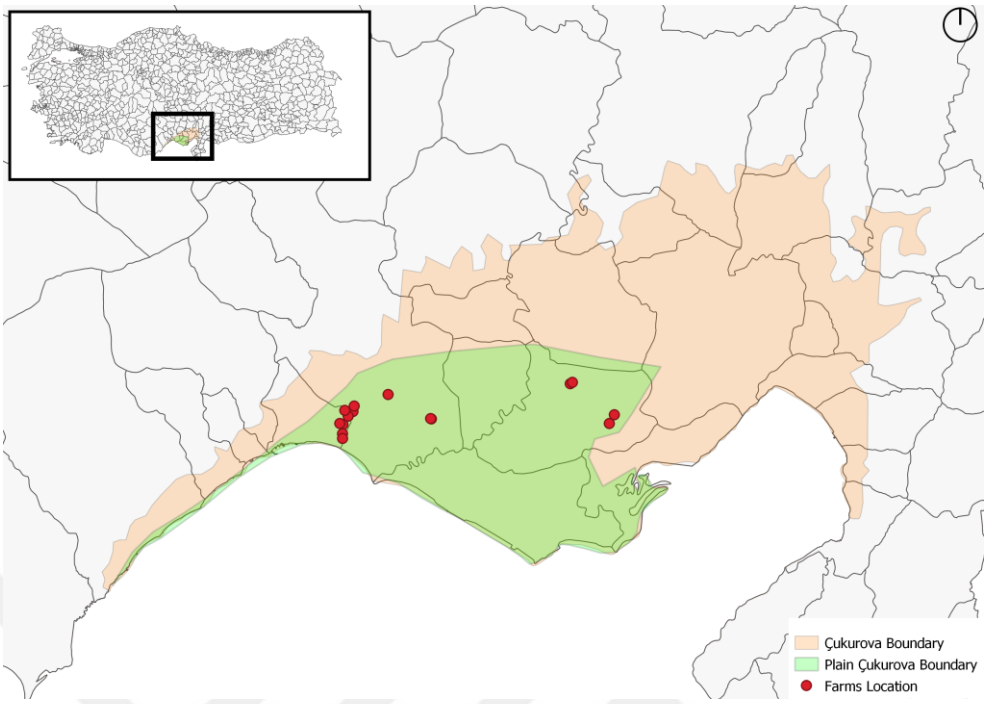


Figure 19: Farm Locations

The second stage will cover the characteristics of the farm in terms of human and spatial aspects. Under the human title, information will be provided on how many people reside in the current state, how many are employees and employers, and what business model is used. Later, information about building typology, spaces, functions, and usage will be provided if there are any special spaces.

Finally, we will discuss the history of the farms. Although most farms could not be reached for this information, we assume farms built before 1950 experienced similar spatial events and transformations. Therefore, we will provide information about how the special spaces on the farms were used, how the old building materials affected the spaces, and the information obtained through observations and interviews.

3.2.1. Case 1: Utanç Farm

Utanç (Shame) Farm is located in Camili village, Yüreğir district, Adana. According to the farm owner, it has been in service since the 1850s and owned by the Kodal family since the 1960s. The farm covers over 1200 decares of land and mainly focuses on corn, citrus, and peach orchard

farming. The farm's location is visible from an orthographic position taken by a drone, and the image of the entrance gate is shown below. Its proximity to the irrigation canal was important in choosing the location.

Figure 20: Orthographic Utanç Farm Photo, Firat, 2021

Currently, there are three permanent employees residing on the farm. One of them has a spouse and two children, and they are responsible for the farm and courtyard as they are the family of the farmhand (kahya). The farm owner has a temporary living space on the farm's first floor, consisting of a room and a bathroom. That means that the farm owner does not reside permanently on the farm. The primary reason for this is that the farm has turned into a multi-partnered and corporate business due to being run by a large family that split through inheritance. Additionally, the farm is located half an hour from the city centre of Adana, and the farm owners have landed in other locations, so they do not have to stay on the farm.

Figure 21: Drone Photo from Utanç Farm's Entrance, Firat,2021

In terms of the structural condition of the farm, the buildings are not arranged in a way that forms a courtyard, as depicted in the plan below. The masonry structures surrounding the buildings and spaces define the farm's boundaries. The courtyard comprises a private fruit garden, buildings, and open storage areas. These spaces define the courtyard.

The farm owner parks their personal vehicles and agricultural equipment in the same area, blurring the boundaries between work and personal life within the work environment. As a personal space, the top of the plan includes various fruit trees that are the farm owner's preference, and there is a small production of seasonal vegetables in the greenhouse for their own houses and farm workers. Generally, as the farm owner does not use this place as a home, there are no spaces for purposes other than business.

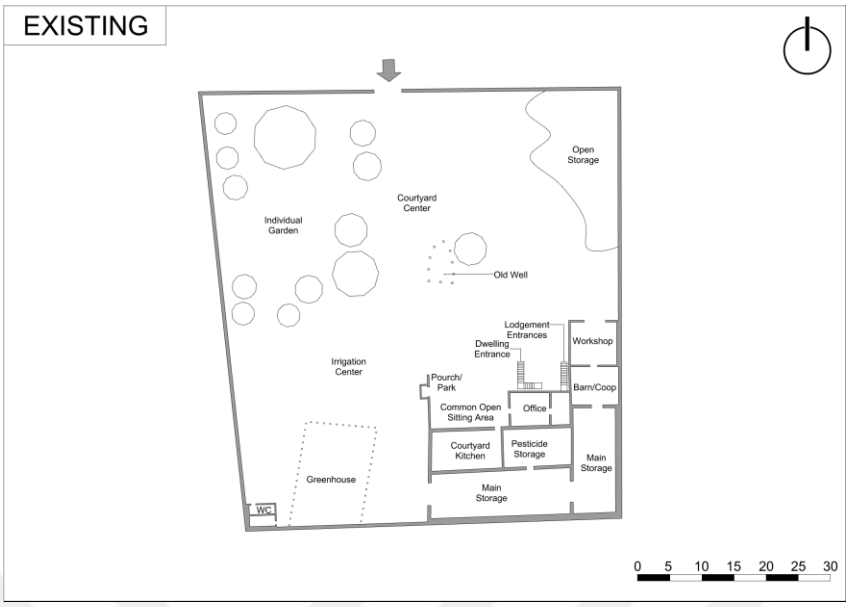


Figure 22: Existing Plan of Utanç Farm (Firat, 2023

Unfortunately, the current owners do not know about the old building structure of the farm, so a plan could not be drawn up. However, in the current personal fruit garden area, which also served as an olive oil and flour production area before the 1960s, there are areas carved out of a single stone. These can be observed in the top left of the aerial photo above. While the main warehouse and kitchen part of the current building block is an old masonry structure, it can be seen that all the other areas were added later or were demolished and rebuilt. Generally, the farm used to have a main kitchen, an accommodation area, and an independent mill. There was also a common well in the courtyard that served the general water needs. In other words, it used to be a collective living farm with workers and owners living together, but today it is a business location.

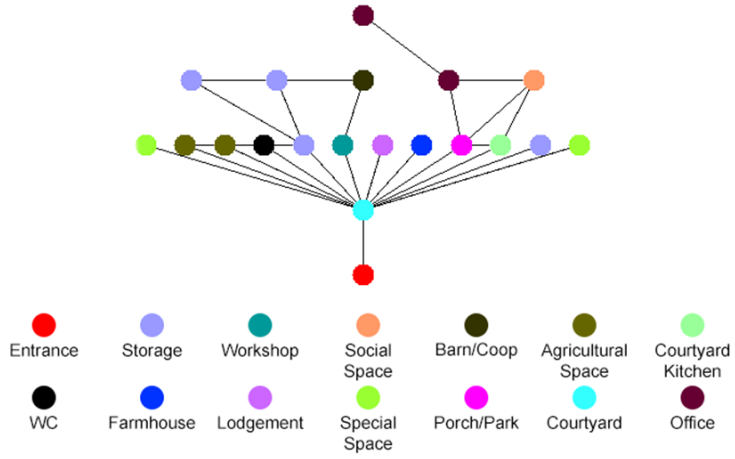


Figure 23: Utanç Farm Justified Graph

Additionally, a justified graph was created by examining the correlations between the spaces within the farm. The complex spaces are observed around storage areas and social areas. The common connection in all spaces is the courtyard. The significance of the courtyard as an organizational spatial element in the farm structures in Çukurova is evident in the Utanç Farm. Due to the lack of an active lifestyle, reading fewer spaces and correlations compared to other farms from the justified graph is possible.

On the other hand, although most of the farms in the region belonged to the Armenians who were originally from the old region, the village of Camili, where they are located, is said to be a village of Turkish origin and the only farm associated with the village. A farm was mentioned in the 1918-1920 French-Armenian cooperation events. At that time, various sources tell of the events on the farm under the name of Rifat Efendi Farm (Cora, 2020). Unfortunately, all the villagers took refuge to escape the events and were killed here by Armenian-French forces. Since the event occurred here, it has been called the Utanç (Shame) Farm. After the bloody incidents on the farm, it was abandoned and transferred to the state treasury. Later, it changed hands several times and eventually ended up with the current owners. In the 2000s, when the Monuments Board was established, the information board seen in the figure below was added.

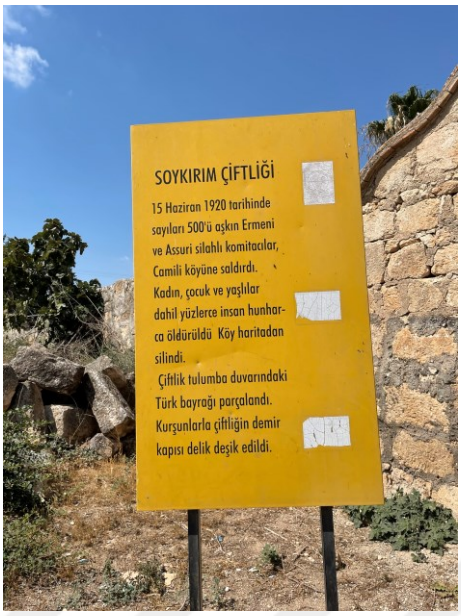


Figure 24: Historical Information Board in Utanç Farm, Firat, 2021

3.2.2. Case 2: Sapandere Farm

Sapandere Farm is located in the Adanalıoğlu neighbourhood of the Akdeniz district in the province of Mersin. It is considered the oldest farm among the farms included in the thesis. The farm was left ownerless after the Armenian events in the region in 1918. Later on, it was transferred to the treasury and in 1927, Sapandere Farm and its lands were given to a tribal leader, (bey) named Hacı Bedir Aga, in exchange for expropriating his lands in Adıyaman. The farm, owned by the same family from that day until the 1980s, changed hands many times and has been owned by the Çavuş family since 2002. It is said that during the time of Hacı Bedir Ağa, the farm served over 8,000 hectares of land, but today it serves only 70 hectares. While only cotton and wheat were cultivated in the past, it serves vegetable greenhouses and citrus orchards today. The surrounding greenhouses and farm structures can be seen in the images below.

Figure 25: Sapandere Farm Orthographic Photo, Fırat, 2023

Figure 26: Sapandere Farm Entrance, 2023, Fırat

Currently, a family of six resides on the farm. We can say that the farm is currently operating as a family business. The farm owners migrated as seasonal workers from Southeast Anatolia in the 1960s and became landowners by saving up for their physical labour. Therefore, their socio-economic status is relatively lower than other farm owners within the scope of work. However, since they still use the farm traditionally, its spatial elements have changed the least, making it one of the few farms still using old structures in today's Cukurova. The image above

shows that the farm is entered through an arched gate, and the farm owner's house is located above the gate. Upon entering the farm, there are stables and storage areas on the right side and a kitchen and pantry on the left, part of an L-shaped structure, while lodgings are right across from the gate. The farm kitchen is also a living space where social activities occur. The open areas without buildings are surrounded by solid walls with a height of 1.5 meters. As seen in the plan below, it can be said that it is a closed system in an almost square shape. In addition, it can be seen that an open barn has been added, but since it is a group of buildings that have been destroyed over time, it is in a more independent and non-functional state than the main structure and courtyard. Especially the location of the house within the farm, along with the hierarchy and observation area within the farm, can be considered the most important architectural element. It is a visually dominant area due to being located in a position where it can overlook both the entire courtyard and the surrounding lands.

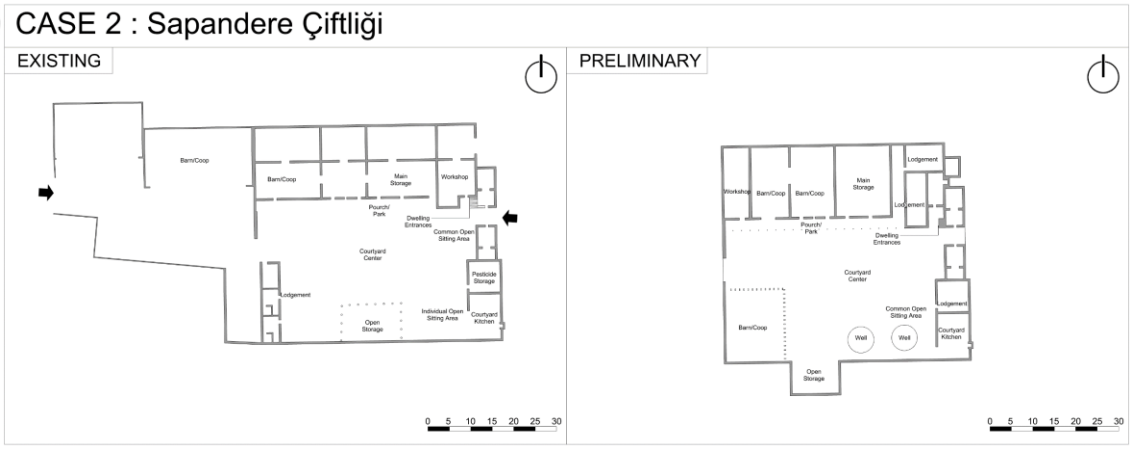


Figure 27: Sapandere Farm Existing and Preliminary Plans, (Firat,2023)

Figure 28: Courtyard Photo of Sapandere Farm, Firat, 2023

One of the most important elements that have continued in the past and present use of the farm is the functional courtyard kitchen. People living in villages near the farm used to come to this farm's kitchen to buy bread from the oven that had now collapsed. Although there may not be such an active and collective life now, the kitchen is still a shared area for the family and the courtyard. In addition, in the visual below, we see a fountain carved from a single stone that we think was used as a fountain and bath but now serves as storage. On the 1944 aerial photographs we obtained from the Civil Aviation Command, a well or cistern-like structure can be seen behind this location, most likely the bathhouse or hammam of the farm. As seen in the entrance photo of the farm, an additional structure was added later as a bathroom and toilet, where the roof did not continue. Apart from these, there used to be enough accommodation space for four families on the farm, except for the farm owner, and a stable for horses, but these areas have now been converted to a storage room and a cow stable.

Figure 29: Sapandere Bath and Bath Entrance, Firat, 2023

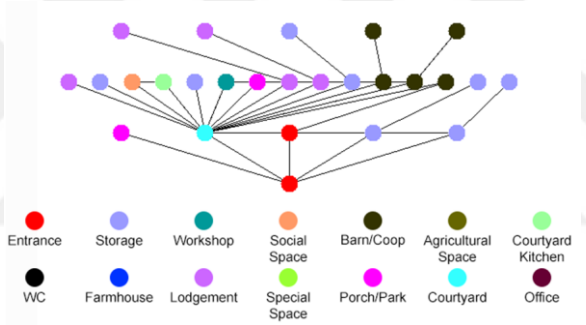


Figure 30: Sapandere Farm Existing Situation Justified Graph

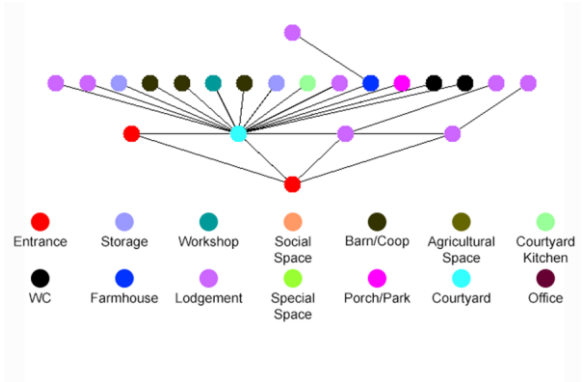


Figure 31: Sapandere Farm Preliminary Situation Justified Graph

Furthermore, the justified graph of Sapandere Farm was examined. This graph observes similar complexities and depths in both the preliminary and existing conditions. It can be said that

there are more spaces in the fourth depth in the preliminary condition, as there are more residents on the farm and livestock farming is actively carried out. By examining the colours of the spaces, it is seen that these housing units give way to storage areas. The organizational courtyard space is seen to facilitate the spatial relationships within the farm.

Aside from all of these, it can be said that Mersin was the area where irrigation channels first arrived, according to the maps obtained from the Ottoman archives. The red-marked location on the maps below corresponds to the Sapandere farm. In the second map, we can see the French spelling of Sapandere's name, and it is the only structure and area that retains its name as a village or something, even though the names of the surrounding villages and towns are different today. The maps belong to the 1800s, but we can find the exact dates. According to Uguz, two farms were destroyed and burned in the area during the events in 1918 near the Sapandere farm [65], but today, there is no artefact in the area except for the "Şıh Mahmud Türbesi" and the cemetery next to it. We can see from the irrigation canal maps that the area was swampy, and as a result, there were drainage channels and eucalyptus trees used in the area's rehabilitation efforts.

Figure 32: 1800s French Map Shows Sapandere, Presidency of State Archives Ottoman Archive

Figure 33: Ottoman and French Irrigation Canal Maps, Presidency of State Archives Ottoman Archive

3.2.3. Case 3: Mustafa Gazi Fırat Farm

Mustafa Gazi Fırat (MGF) Farm is located in the Adanalıoğlu neighbourhood of the Akdeniz district in the province of Mersin. According to the history of the roof tiles removed when the farmhouse's roof was rebuilt and the aerial photographs provided by the Civil Aviation Authority, it was first built in 1955. The farm's land has been in the same family since the Republic. The farm currently serves 355 decares of land, mainly providing services to avocado, pomegranate orchards, and citrus varieties.

Figure 34: MGF Farm Orthographic Photo (Firat, 2023)

Figure 35: MGF Farm Perspective Photo (Firat, 2023)

Eight people reside on the farm, including three farm owners; the rest are farm employees and their families. The farm, passed down through generations in a large family, has now become a family business run by a small family. In addition to the family of employees residing on the farm, three workers from nearby villages also work full-time in the farm fields. Regarding the structure, the farm has a house, two lodges, several sheds, and storage rooms. As seen in the following plans, while the farm originally had a single courtyard organization, nowadays, it operates with a two-courtyard organization. It can be said that a secondary courtyard solution was reached over time due to the hierarchy between the farm owner and the worker. However, the farmhouse is visually dominant, overlooking the main entrance and the ground floor seating, including the second courtyard. At the main entrance is a farmhouse on the left, an irrigation centre on the right, and a personal greenhouse area. As irrigation centres have become more widespread in the last 20 years, they have inevitably become a space that changes the originally planned organization of farms. Farm owners have various private spaces in their summer houses, such as open and closed sitting areas, swimming pools, and barbecue areas, as they live on their farms. Additionally, on the largest veranda on the farm, there are various classic vehicles and a workshop, which are the personal hobbies of the farm owner. Employees can use the road outside the farm's boundaries and reach their homes from the secondary courtyard area.

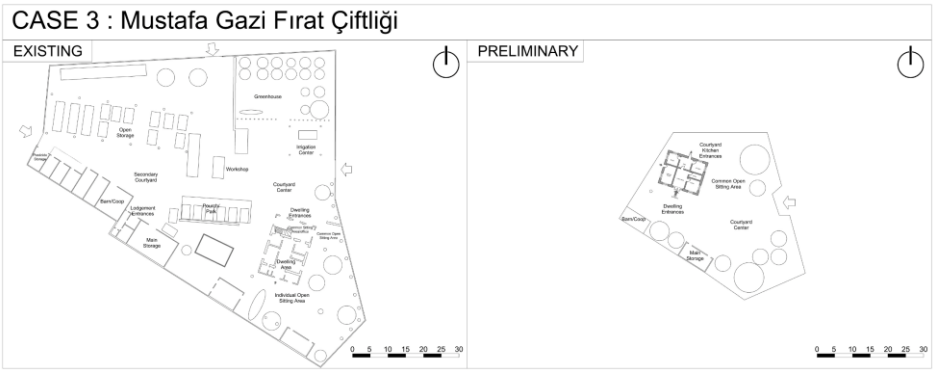


Figure 36: MGF Farm Plans, Firat, 2023

As seen in the plan visual above, the farm is in a courtyard with only a house as a structure. In the preliminary condition, the house had separate spaces with different entrances separated by walls inside for the workers and the farm owner. Later, an upper floor was added, and additions were made to the front and back, making it a single structure used by the farm owners for all areas. However, the biggest change starts with relocating the farm entrance to a different place. Thus, the old courtyard becomes the farm owner's private landscaping area, creating a new courtyard at the new main entrance. Later, with new warehouses and a residence built 300 meters from the farmhouse, that area turned into an organized working space. With the new irrigation technology, the emerging irrigation centre causes the farmhouse to become more integrated with agriculture and daily life, even though the farmhouse and workspace are completely separated. Therefore, in a farm within certain boundaries, even if life and work are considered separately, the intersection of two separate functions can be inevitable due to future technological requirements or other external factors.

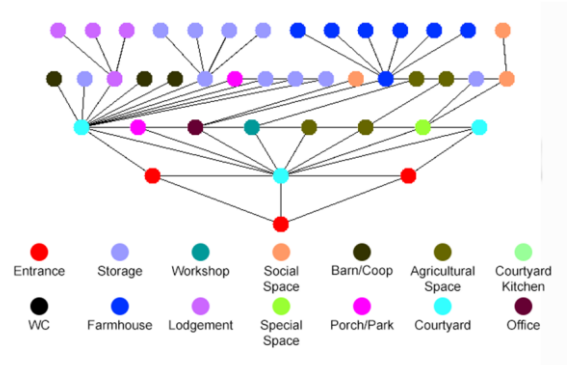


Figure 37: MGF Farm Existing Situation Justified Graph

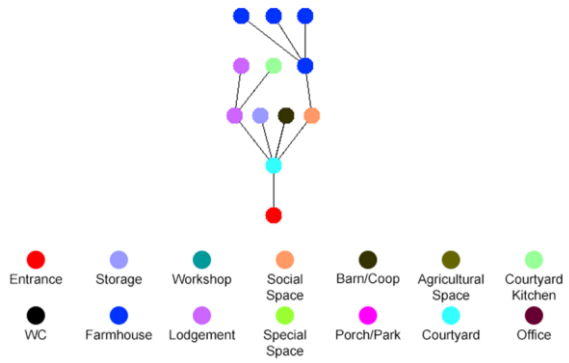


Figure 38: MGF Farm Preliminary Situation Justified Graph

Furthermore, justified graphs of the MGF farm have also been examined. The most critical difference between the preliminary and existing versions is the addition of several new spaces to the MGF farm. In terms of the graph context, we can say that both the population of residents and the serviced land area of the farm have increased, but the farm owners, who have been living there since 1955, have also created new spaces for living and recreational purposes. Apart from that, no additional depth is observed. Lodgings and the functions of the farmhouse constitute the deepest spaces. Unlike the other farms, this farm has three courtyards. Although these three courtyards may seem separate, we can say that the courtyard in front of the farm house can be considered as the main courtyard. Thus, it can be argued that the courtyard closest to the living area in the farms carries the highest organizational aspect of space.

Figure 39: MGF Farm, Housing, Courtyard, Backyard, Firat, 2023

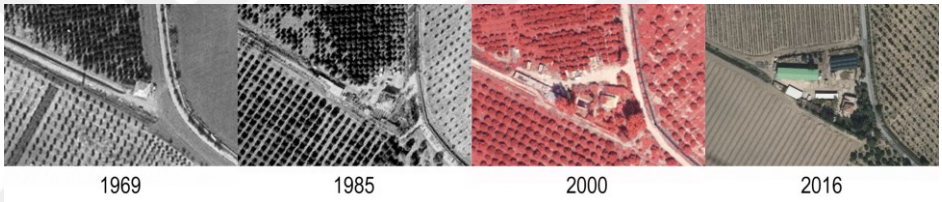


Figure 40: Civil Aviation General Command Arial Photos

Aside from these, this farm has an important variable in terms of agriculture. Horticultural farming has been carried out on this farm since its construction. The first citrus garden was planted in the Mersin plain and its neighbouring land in 1957. As citrus gardens were also recently planted in Adana, we cannot generalize this as the first in Cukurova. Therefore, it is unique among the old farms that were not visible in terms of grain silo-like structures and transformations. The most important reason for being suitable for garden farming is that it is one of the first lands where irrigation channels passed. The historical maps in the 20th and 21st figures in the description of Sapandere Farm show that as one gets closer to the sea, the lands become swampy. Due to its proximity to the Adana-Mersin main road and its fertile soil, this was the most reasonable garden-farming land. To conclude, it is one of the important farms in the research scope, where garden farming has always been carried out, and the farm owner resided.

3.2.4. Case 4: Özgiray Farm

İzettin Özgiray (İÖ) Farm is a farm located in Herekli village, Yüreğir district of Adana. The farm was built in the 1930s and was a cotton farm with the largest cotton warehouses in the region. Since its establishment, the farm has been passed down through inheritance among the same family members and has survived to the present day. Currently, it serves 350 decares of citrus orchards, but cotton farming was done on an area of over 4000 decares back then.

Figure 41: İÖ Farm Top View, Firat, 2023

Three employees and their families reside on the farm, in addition to the owner. As the land on this farm was inherited and divided among family members, it is considered a family business rather than a corporate entity. Although the farm owner does not permanently reside there, they spend most days of the week at the farm, so the first farmhouse they built is still actively used. The employees are staying in a newly built three-story apartment building consisting of six flats, built in 2017. Spatially, the accommodation facilities are organized in a U-shaped layout with a single courtyard at the farm entrance. The farmer has a green landscape area they have reserved for themselves, located right next to their house, but since they cannot

permanently reside there, their employees can use it. There are six large cotton warehouses in the industrial area, but most are inactive. There are sheds for semi-open vehicles, agricultural equipment, and an irrigation centre beyond the warehouses.

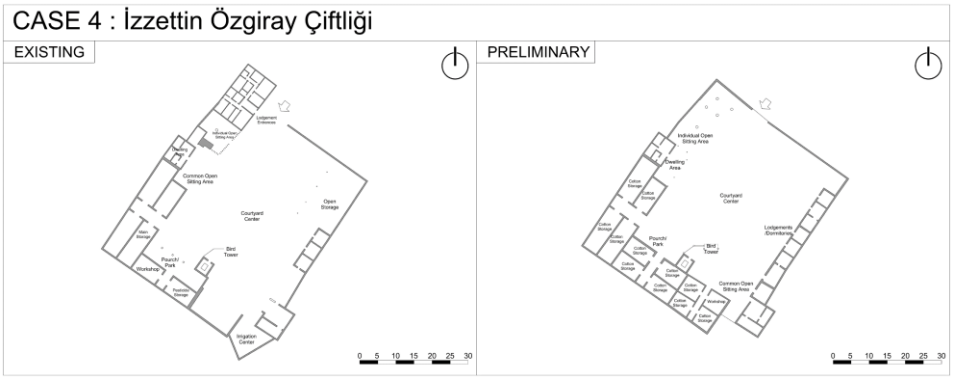


Figure 42: İÖ Farm Plans, Firat, 2023

Figure 43: İO Farm House, Firat, 2023

As the primary purpose of this farm was to serve cotton fields and to accommodate more than 20 employees, it contains critical spaces that have become non-functional or changed their function. While there used to be 12 different warehouses for cotton in the past, today, only six remain, and the remaining areas have been converted into open parking lots. In the plans, the courtyard kitchen in the bottom left corner is currently only used as a toilet and storage, and a

semi-open wooden awning is used as a dining area. Again in the same corner, a wall is being built that disrupts the rectangular shape of the farm for the irrigation centre, but it becomes a useless space because the well here has become ineffective. While in the old plan, the eight rooms next to the kitchen were serving as dormitories for employees, they have now become unused areas. In addition to these areas, there is a bird tower with a height of 8 meters that was previously active on the farm. Although it is not a very common occurrence in the region, it has been reported by farm workers that the reason for its construction is to prevent and reduce various harmful insects that affect cotton.

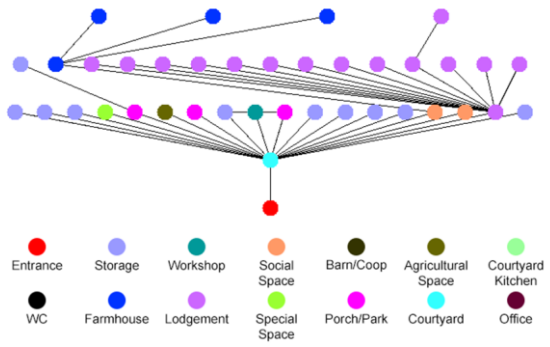


Figure 44: Özgiray Farm Existing Situation Justified Graph

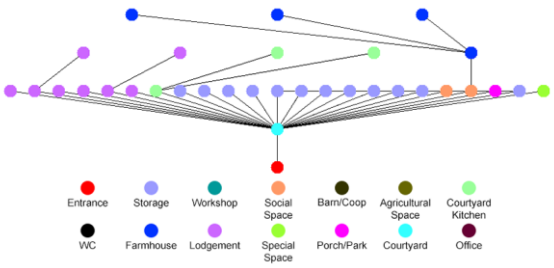


Figure 45: Özgiray Farm Preliminary Situation Justified Graph

Additionally, the justified graphs of the Özgiray farm have been examined. When comparing the preliminary and existing states, we can say there is a greater depth of spatial organization on the farm today. Apart from that, there have been no significant changes in the

graphs. The increased depth is due to the additional lodging structure, which resembles modern apartment units and accommodates multiple residential functions within it, which is reflected in the graph. Furthermore, the lodging spaces have transitioned from the second depth to the third and fourth depths. The new lodging building is directly related to contemporary notions of privacy.

Figure 46: İÖ Farm's Bird Tower

The farm's name comes from İzzettin Özgiray, the president of the Adana Farmers Union and one of the region's most prominent figures in cotton farming. With the development of irrigation opportunities in the Adana plain, the cotton yield per decare doubled, and our cotton production ranked among the top in the world between the 1950s and 1970s. However, nowadays, horticulture has become more profitable than cotton farming, so not all areas where the farm is located cultivate cotton or any other field crops. Therefore, it can be said that the situation has shifted from cotton to citrus, rendering some spaces of the İÖ farm useless and preventing the transformation of others. Apart from production transformation, the biggest change is that qualified housing has been provided for farm workers, but even these houses are independent of the entire farm structure.

3.2.5. Case 5: Yolaçan Farm

Yolacan Farm is located in Camili village, Yüreğir district, Adana. Although we cannot find clear information about its construction date, this is certainly a farm dating back to before 1920. According to Abdülgani Girici's book "Memories of Adana Armenian Massacres" (2019), there is a distance of 500 meters between Utanç (Shame) Farm and the village. The book states that the farm was abandoned shortly before the arrival of Armenian invaders in 1920. During the Ottoman and Republic periods, the farm belonging to soldier Abdullah Girici and his family was divided through inheritance. In the 1970s, it was passed on to the Çakmakoğlu family, and since 2000 it has belonged to the Yolaçan family. Currently, it is a farm that serves only a 30-acre citrus grove. Previously, it served on over 1200 decares of land, but today, it is a farm divided through inheritance.

Figure 47: Yolaçan Farm Orthophoto, Firat, 2023

Figure 48: Yolaçan Farm Back Side Perspective, Firat, 2023

Currently, the owner and their family reside permanently on the farm. In addition to the owner, employees and a family of four also take care of both farming and courtyard landscaping tasks. Since the owners did not purchase the farm for agricultural purposes, we can say that farming is not the main focus of this farm, which is mostly used for summer activities and events. However, we can call it a farm because it was initially built for agricultural purposes only, and it still serves an agricultural purpose compared to other farms within the scope of its thesis. Many places on the farm have not been converted for their agricultural purpose. The farm is almost a perfect square in shape. The buildings for livestock purposes are in a single L-shaped unit, and the storage areas are built side by side on the front of the housing.

Moreover, the farm owner's house is in a central position that dominates the courtyard and the entrance. As the farm courtyard began to lose its agricultural purpose, much of it was replaced with green landscape areas. However, as seen in the aerial photograph below, some roads can be used by large vehicles such as tractors and trucks to access other areas except for the farm owner's house. The longest structure of the farm, where the photo can be seen below, is currently used for goose breeding. The enclosed areas following this long space are dark areas without light,

used for producing culture mushrooms, even though they are intended for stables. Next to the housing, there is still a courtyard kitchen where some guests can be entertained. The remaining areas are used as agricultural storage space.

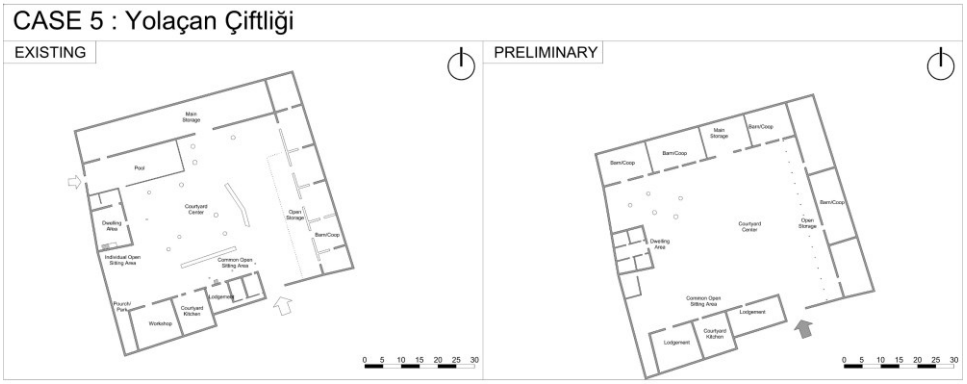


Figure 49: Yolaçan Farm's Plans, Firat, 2023

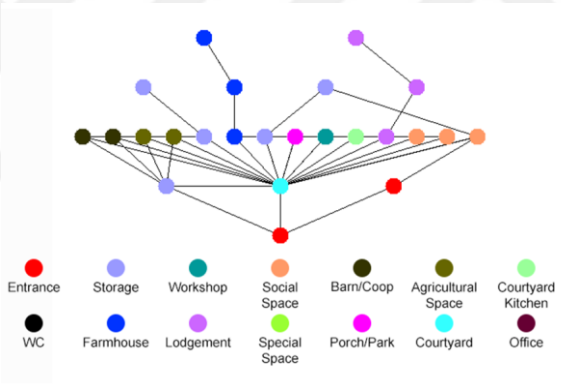


Figure 50: Yolaçan Farm Existing Situation Justified Graph

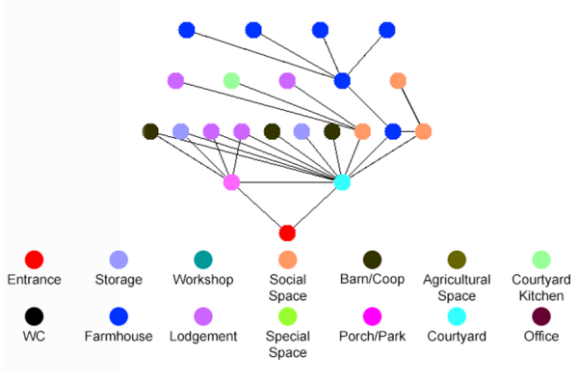


Figure 51: Yolaçan Farm Preliminary Situation Justified Graph

In addition, the justified graph of the Yolaçan farm has been examined. It can be said that in this farm, the diminished importance of agriculture in the present day is reflected in the graph. Previously, the farm house had a high level of privacy, as indicated by the graphs, but today, the courtyard has transformed into shallower and more directly connected spaces. Since the entire farm has been converted into a landscape area, it is a compact, large house. The hierarchy between the employees in the lodging and the farm owner's house cannot be discerned from this graph, as they are at the same depth levels. Therefore, despite the decreased agricultural function, the courtyard maintains and reinforces its main organizational feature.

In the history of the farm, its name is mentioned in events such as the "Escape Escape"(Kaç Kaç) incidents in Adana in 1920, such as the "Shame Farm". Girici (2019) states in his book that they evacuated the farm but also writes that the villagers may have taken refuge there to escape from Armenian rebels. After the incidents, it is seen that there is no major damage to the farm, but most of the doors are broken, and there are bullet marks on them [66]. Therefore, it can be said that everyone from Camili village centre escaped and took refuge in the nearest places around. In addition, while the farmyard was previously empty and used for various agricultural activities and events, it has mostly turned into a personal landscaping area such as a swimming pool, barbecue area, and lawn area. The farmhouse is a 2-story structure. The current owners have expanded the house by converting the lower floor from a wooden construction into a portico-style shaded area and enclosing the wide terraces on the upper floor. Therefore, it stands out from the other buildings on the farm, but its structure is still made of the same material as all other building groups.

Figure 52: Yolaçan Farm Owner's House, Fırat, 2023

3.2.6. Case 6: Çaylaklar Farm

Çaylaklar Farm is a farm located in Büyükkapılı village, Yüreğir district of Adana, that has been serving 600 hectares of land around the farm owned by the same family since the 1960s. Until 1968, the farm only produced grain and cotton, but now it serves citrus and peach orchards.

Figure 53: Çaylaklar Farm Perspective Photo, Firat, 2023

Figure 54: Çaylaklar Farm Orthophoto, Firat, 2023

Today, only one permanent worker stays on the farm. For the reason that there is a village within walking distance of the farm, other workers live in the village. The farm is a corporate enterprise since the farm owners have many lands outside this area. Therefore, agricultural engineers responsible for the farm deal with agricultural production instead of a hierarchy like the boss-employee relationship. There are previously unused spaces at the entrance of the farm that used to serve as a barn. Then there is a personal green landscape area and living spaces. All other areas are used for storage purposes. There is a pergola in the living area shaded by a grapevine. There are three rooms in this area, one is an office, one is a dormitory, and the other is a kitchen. This area is where the farm owners and workers spend their time together. The landscape area near here is where collective events such as barbecues are held on special occasions.

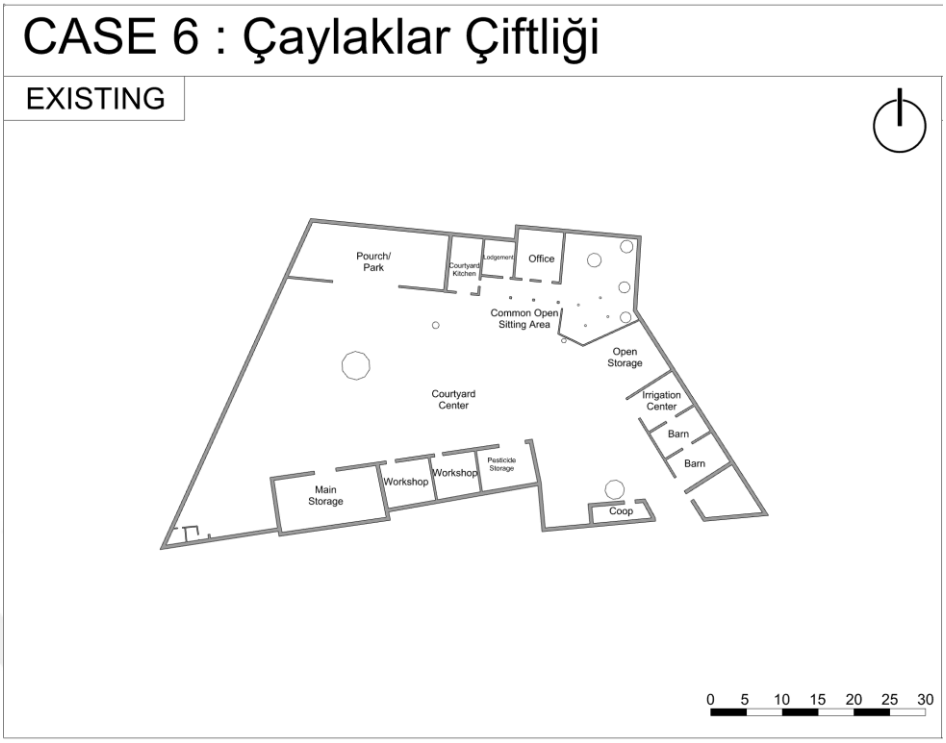


Figure 55: Çaylaklar Farm Plan, Firat, 2023

All structures in the farm except for the main storage area are said to have been built before 1950. They are all made of rubble stone walls with a thickness of 50 centimetres. The owner's house is on a large veranda, and the workers' dormitories are located here, which we call the current living area. So the land served on the farm expanded, and personal living spaces also began to turn into workspaces over time. Unlike other farms, a new well was drilled in the area where the old well was located and turned into an irrigation centre. Thus, it is still one of the farms that maintain the relationship with daily water access and living areas. Unfortunately, since there are no readable traces of its past state or the owner's complete spatial knowledge, the plan of its past state could not be drawn.

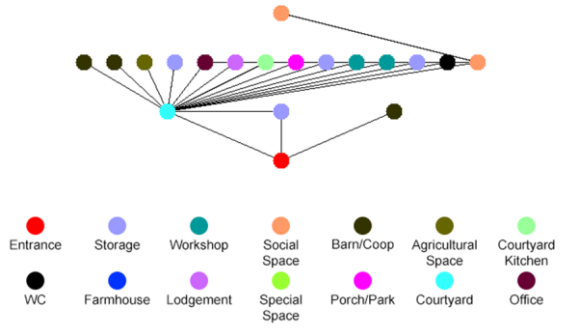


Figure 56: Çaylaklar Farm Existing Situation Justified Graph

Lastly, the justified graph of the Çaylaklar farm has been examined. Since the preliminary and existing states could not be compared, only the current condition can be interpreted. The warehouse and stable at the first depth level appear disconnected from the courtyard as they have become functionally obsolete in the present day. Apart from that, all other spaces surround the courtyard. The graph reflects that the farm's highest level of privacy can be found in a single space. Due to the transition from COSA to IOSA, apart from the deepening of social areas, this farm is one of those where deepening in service of agricultural production is not observed.

3.2.7. Case 7: Gürani Farm

Gürani Farm is located in the Köselerli neighbourhood of the Akdeniz district in Mersin. The farm, which the same family has owned since the 1930s, currently cultivates 150 hectares of land. Previously, the farm cultivated 2,000 decares of land, but it has since shrunk due to the owners changing industries and now only uses the land adjacent to the farm. They have been growing citrus fruits since the 1960s.

Figure 57: Gürani Farm Ortographic Photo (Firat, 2023)

Figure 58: Gürani Farm Perspective, Firat, 2023

Currently, two employees and their families reside permanently on the farm. The farm owners have another house, which they restored to match the historical houses in Tarsus, but they do not reside in it permanently. All the buildings, including the house, are L-shaped, with a small

courtyard in the middle, a green landscape area, and a swimming pool in the rest of the space. The courtyard has large trees, such as a 50-year-old plane tree, an Israeli rubber tree, and a poplar. It is possible to enter the farm's warehouses from the courtyard, but separate entrances are outside for loading and active use. That is mainly because the farm owner has completely turned the courtyard into a personal area. There is a large open kitchen in the landscape area of the farm's courtyard, as it used to be, but it has been changed to function as a barbecue, gathering, and event area for special occasions rather than for the farm and its employees. There is another building; before entering the courtyard of the farm. This building is also for business purposes and serves as an office, meaning that clear boundaries have been drawn between work and private life on this farm.

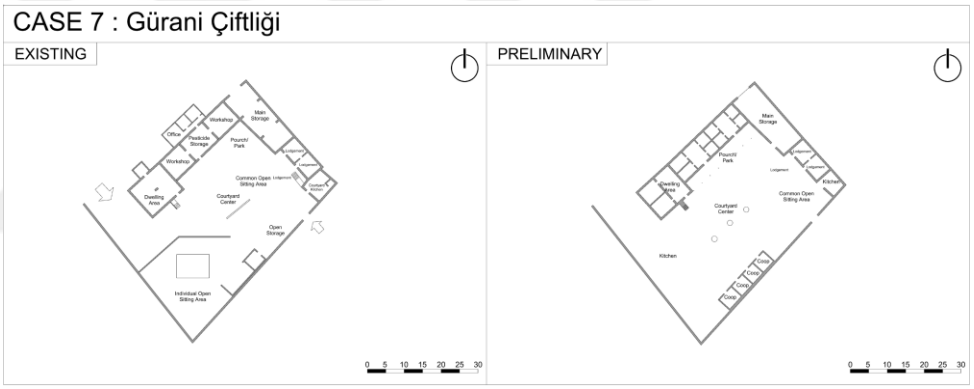


Figure 59: Gürani Farm Plans, Firat, 2023

Figure 60: Gürani Farm Courtyard Kitchen From Pool, Firat, 2023

Due to a large fire in the 1990s, the roof and some walls of the farmhouse were destroyed. The tiled roof was rebuilt as a flat reinforced concrete roof. The farmhouse remained as a stone wall on the lower level and a wooden structure on the upper level, similar to old Tarsus houses. The image below shows that the lower level serves as a kitchen and living area while the upper level contains bedrooms. However, the staircase leading to the upper level is accessed outside. Like other old farmhouses, the upper level likely served as the farmhouse owner's bedroom, while the lower level was used as the workers' kitchen. A two-story space, six meters by two meters wide, was added to the farmhouse from the outside, including wet areas that were not originally present.

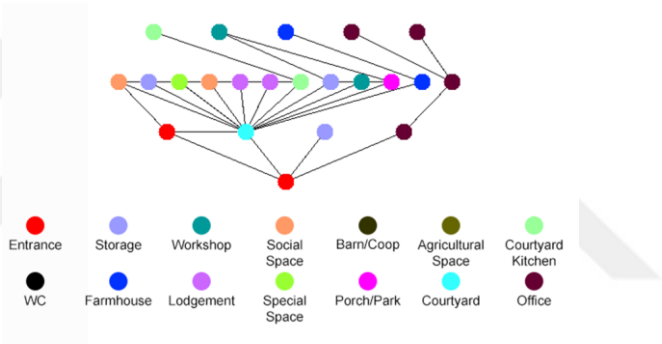


Figure 61: Gürani Farm Existing Situation Justified Graph

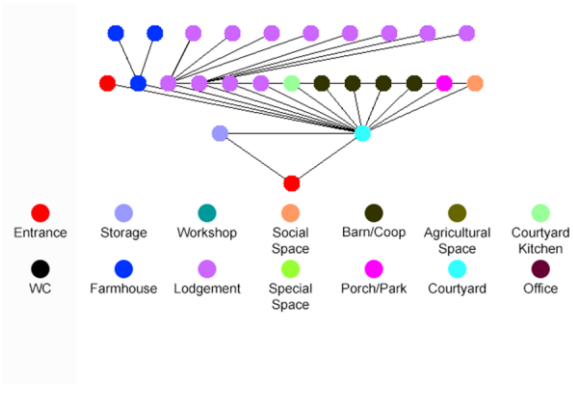


Figure 62: Gürani Farm Preliminary Situation Justified Graph

In addition to all of these, the justified graph of the Gürani farm has been examined, including the preliminary and existing graphs. The general change observed here shows significant similarity to the Yolaçan farm. The farm courtyard has completely transformed into a

living area, causing the lodging and farmhouse to decrease. The courtyard has become both a social living space and is associated with certain agricultural spaces determined by a designated node as the entrance to the farm. However, despite most spaces being connected to the courtyard, it does not unify them organizationally. Nevertheless, since most spaces still depend on the courtyard, it retains its role as the main organizational space.

Figure 63: Gürani Farm's House, Firat, 2023

Generally, we can say that this farm has been transformed from its original form. The biggest transformation in this farm is due to the owner now using it as a summer house, which has created very clear boundaries between work and life, but despite this, they share the same courtyard with their employees and families. So, the fact that the farmyard has moved away from agriculture in large amounts has not created strong hierarchical distinctions inside.

3.2.8. Case 8: Sarıköşk Farm

Sarikosk Farm is located in the village of Çağbaşı in the district of Tarsus in the province of Mersin. The farm wall has a date engraved, indicating that it was built in 1952. It has belonged to the same family since then and has been inherited and shared among family members until today. The family only keeps the farm to preserve their past, as it is inactive and has more than five partners from the same family. We do not know how much land they serve, as the owners also

have land in Adana. However, it was previously reported by an employee that it served over 2000 decares of land in Çağbaşı village.

Figure 64: Sarıköşk's Housing, Firat, 2023

Figure 65: Sarıköşk Orthophoto, Firat, 2023

Currently, only one permanent employee resides on the farm in their lodging. The farm is no longer in active use but used to operate as a family business. The existing structure has two separate courtyards, separated by a dividing wall that starts from the middle outer walls of the farmhouse. The entrance to the owner's house courtyard and the entrance to the lodge courtyard are in different places, creating a clear distinction between work and personal life. This separation

has existed since the first day of the farm's operation, but other farm cases of work and personal life were implemented in time. The courtyard where the farmhouse is located has a large gate that can be accessed from the work yard. Also, reaching both courtyards is possible because the farmhouse's ground floor was used as a lodgement. Unfortunately, we could not find any information except the current condition of the farm, but it can be understood from the ruins that there are buildings made of both adobe stones adjacent to the courtyard walls. That can also be seen from the aerial photos we took. The farm owner had added a concrete staircase and terrace as the wooden stairs had decayed over time, but the farm's upper floor slab and roof are still built on a wooden structure, as seen in the photo below.

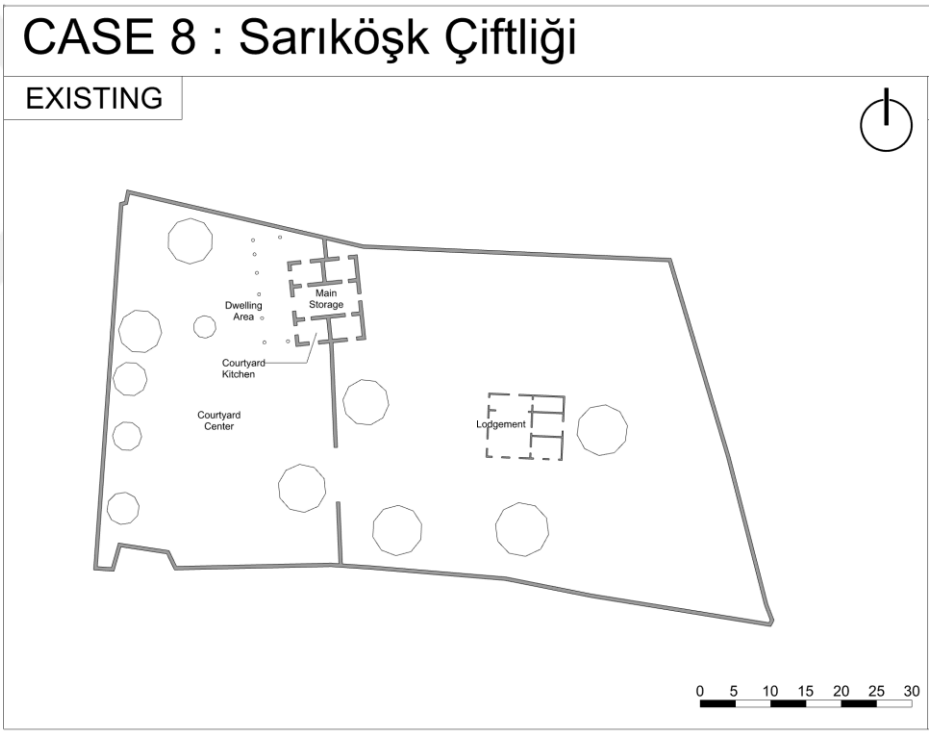


Figure 66: Sarıköşk Plan, Firat, 2023

Figure 67: Sarıköşk's Information Tablet, Firat, 2023

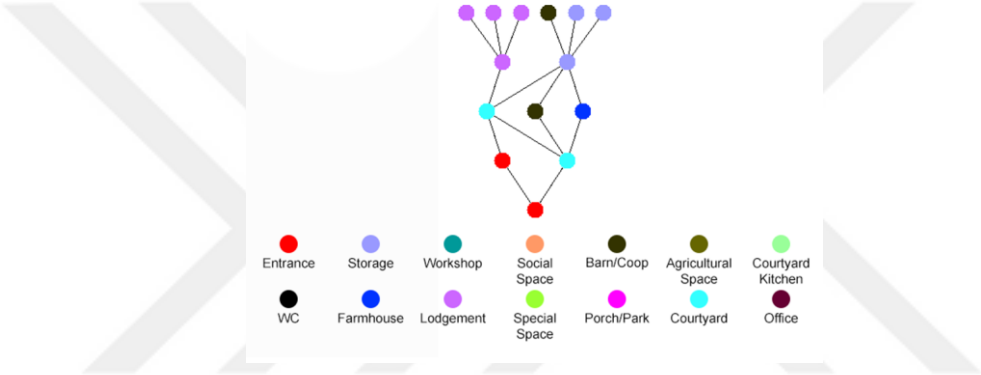


Figure 68: Sarıköşk Farm Existing Situation Justified Graph

In addition, the justified graph of the Sarıköşk farm has been examined. Since a comparison between the preliminary and existing graphs could not be made, only the existing condition will be interpreted. In this case, the courtyard of the farm house is at the minimum depth level. This means that the courtyard of the farm house, which serves as the living area, has the most connecting and unifying feature among the courtyards. Like other farms with multiple courtyards, the lower depth level of the farm house courtyard is a common observation.

As a result, we cannot work on a before-after study as there was no active farming operation on this farm. However, the clarification of the separation between work and personal spaces, our hypothesis, indicates that this farm has been designed as a separate spatial organization since its first day. It is probably still called the Sarıköşk (Yellow Mansion) because it was one of the first residences in the region and was luxurious for its time. Therefore, rural structures with

farm status generally confirm the socio-economic status of individuals and families at the top. Sarıköşk's readable spatial organisation is quite valuable for this thesis.

Figure 69: Wooden Slab, Firat, 2023

3.2.9. Case 9: Eski Teke Farm

Located in the village of Çağbaşı in Mersin Tarsus, which can be considered a neighbour to Sarıköşk, this farm was once used by the Teke family for both small livestock farming and crop agriculture in the 1950s. Nowadays, it is still a farm that carries out small livestock farming. No agricultural work is being done because the farm owner has more than 2000 acres of land, which is not enough space for modern agriculture. Currently, the farm serves as a livestock and housing facility.

Figure 70: Eski Teke Farm Orthophoto (Firat, 2023)

Figure 71: Eski Teke Farm Housing, Firat, 2023

Previously, a small accommodation area was on the farm's upper floor because a family was residing permanently in the centre of Tarsus. Nowadays, the farm's employee lives in this upper-floor accommodation area. The farm owner keeps his up-to-date agricultural equipment and office in a separate storage area 100 meters from the farm because his land is very large. Modern agricultural equipment is expensive and takes up much space, requiring closed, secure and wider areas. Therefore, we can say that this farm is not sufficient for today's agriculture. The farm is situated within a rectangular courtyard consisting of a wall parallel to the road passing in front of it. In the preliminary condition of the housing structure, the owner's house is on the upper floor, and the lodgement is on the lower floor. In front of the lodging are a semi-open courtyard kitchen and an adobe oven, as seen in the image below, which is still actively used by farm workers today. As seen in the plan, small livestock farming is still being carried out in the upper part, and there is a large storage area.

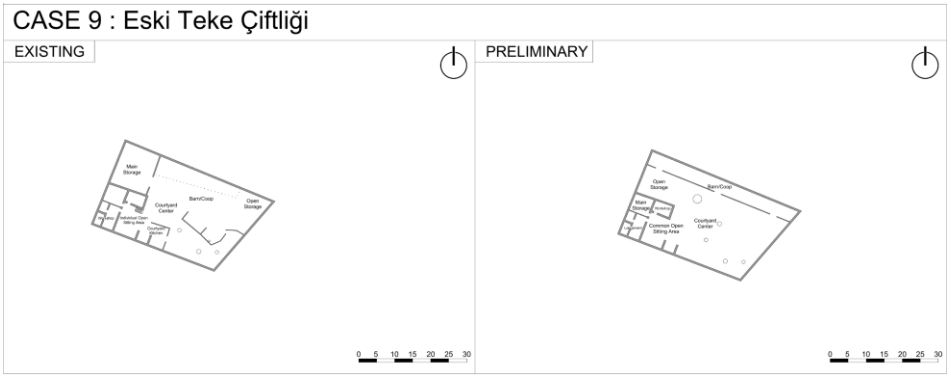


Figure 72: Eski Teke Farm Plans, Firat, 2023

Figure 73: Eski Teke Farm Courtyard Kitchen, Firat, 2023

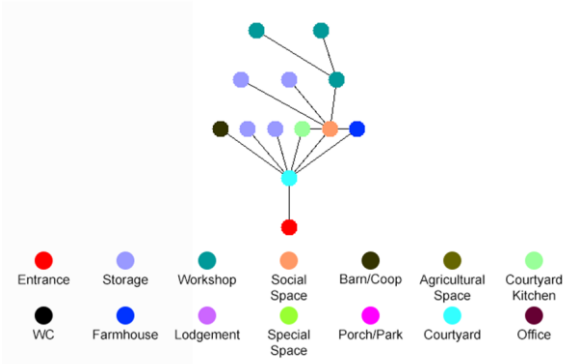


Figure 74: Eski Teke Farm Existing Situation Justified Graph

Figure 75: Eskiteke Farm Preliminary Situation Justified Graph

Additionally, the justified graph of the Eskiteke farm has been examined. Particularly, the preliminary and existing states have observed a critical change. In the present day, since only employees reside on the farm, the lodging areas have been converted into workshop areas. As a result, the lodgings previously at the deepest level in the preliminary state are no longer present. This suggests that as the number of residents decreases on the farm, the depth of spatial organization in farms also tends to decrease.

We can say that the architectural typology and organization of the farm have remained the same since its construction. However, while the first structures of the farm were made of adobe bricks, the storage area added later is made of reinforced concrete, as seen in the image below. Nevertheless, the storage area does not affect the relationship between work and personal; the farm primarily focuses on animal husbandry. The farm retains its original organization and contains active spaces that can be easily studied.

Figure 76: Eski Teke Farm Structural Detail Photos, Firat, 2023

3.2.10. Case 10: Batakçı Kerim Farm

Batakçı Kerim Farm is located in the Bağlarbaşı neighbourhood of the Akdeniz district in Mersin. The farm, which existed even before the Republic, has been owned by the same family since the Republic. Today, corn and wheat farming is carried out predominantly along with peach and citrus orchards. Since the farm is located right on the border of Mersin-Tarsus, most of its land is connected to Tarsus. Previously serving on a 5000 decares land, the farm was divided through inheritance among many partners within the family, therefore currently serving on a 2000 decares land.

Figure 77: Batakçı Kerim Farm Ariel Photo From Entrance, Firat, 2023

Figure 78: Batakçı Kerim Çiftliği Orthophoto, Firat, 2023

Currently, only one employee resides permanently on the farm. The worker only serves as a security guard on the farm. Corporate agricultural production operates organised because the family has grown and become a very collaborative business model. The general typology of the farm is very similar to Sapandere, which is the second farm within the scope of the study. The farm's main entrance passes under the owner's house and has a rectangular courtyard surrounded by storage and housing. On the left side, after entering the farm, there are storage areas where animal husbandry used to be done. On the left are lodgings and workshops, and a large courtyard and a kitchen are in the corner. This kitchen is still the only social space on the farm as an active area. Next to the kitchen, the large structure that used to be a storage area now serves as an irrigation centre. The other entrance to the farm is located between the kitchen and irrigation centre, and it is used to access the agricultural fields. Most areas that used to provide accommodation for four employees have now turned into semi-open and closed storage areas. Batakçı Kerim Farm is one of the farms that has lost its collective farm life and has increased the number of non-functional spaces.

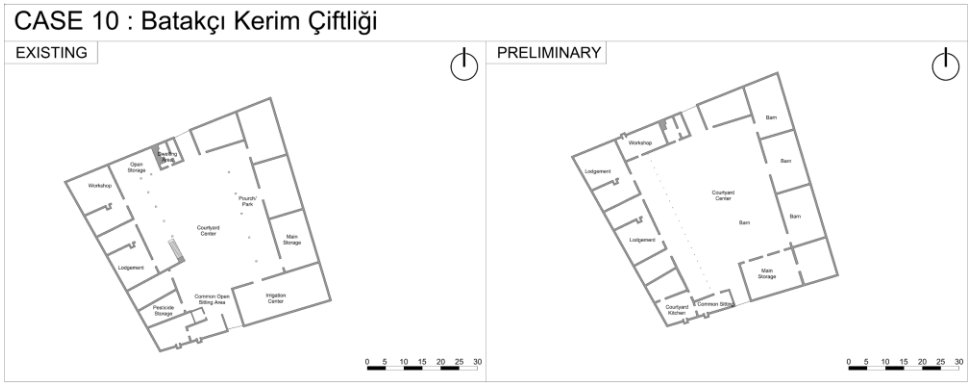


Figure 79: Batakçı Kerim Farm Plan, Firat, 2023

Figure 80: Batakçı Kerim Farm's Courtyard Kitchen, Firat, 2023

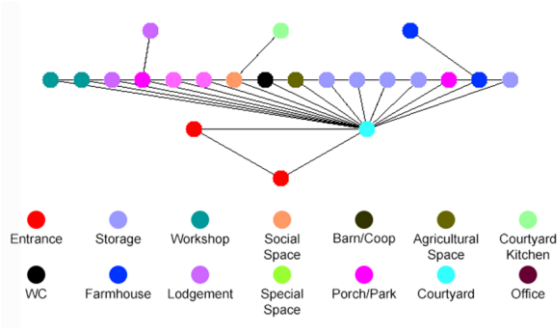


Figure 81: Batakçı Kerim Farm Existing Situation Justified Graph

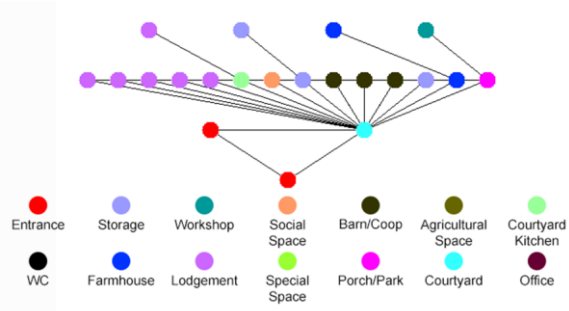


Figure 82: Batakçı Kerim Farm Preliminary Situation Justified Graph

Additionally, the justified graphs of the Batakçı Kerim farm have been examined. Compared to other farms, no major changes have been observed in this farm. Both the depth levels and the number of spaces have remained the same. The only noticeable change is that the old lodging areas have been transformed into various agricultural functions, as observed in the graphs. According to Hillier and Yamu's study, all farms' justified graphs fall into the star category, except for the Batakçı Kerim farm, which falls into the wheel category. This means that the spaces in this farm have courtyard connections and connections among themselves [45].

The name of the farm comes from its owner, Mr Kerim. The name Batakçı (Swamp Man) requires an important explanation. It is believed that the name originates from a card game called “Batak in Turkish, but as seen on the historical map below, most of the farmland was swampy in the recent past. Kerim Bey's efforts in making these lands agriculturally suitable with eucalyptus trees, his nickname "Batakçı" in Turkish and "Swamp Man" in English became the farm's name. Located very close, Karabucak forests, owned by the state and hosting various agricultural institutions, only have eucalyptus trees. It appears from the maps that during the Ottoman period, the land was cultivated to improve it. At the same time, this region is included in the lands that will be improved for agricultural production and research facilities within the scope of the Cukurova Farm project, which could not be realized during the Atatürk era [67]. These lands belong to Atatürk and will become a governmental farm and research facility. They were transferred to the treasury in 1938, and this farm took over a large portion of the land. It also has reclaimed swampy areas that were unsuitable for agriculture.

Figure 83: Old Drainage and Canal Map with Marked Batakçı Kerim Farm Location, Turkey Republic Archive

Figure 84: Batakçı Kerim Farm Housing, Firat, 2023

Overall, it is valuable to understand the typology of old farm structures and their spatial relationships. It can be said that it has been preserved according to its old typology up to the present day. Especially the fact that building with accommodation on the top of the arched stone entrance, such as "Sapandere Farm" in its old state, was built with concrete while preserving the traditional idea. That situation can prove that this typology is still functional. Preserving the traditional structure and spaces of the farm provides a valuable opportunity for study.

3.2.11. Case 11: Kozacılar Farm

Kozacilar Farm is a farm located in Atalar Village, Tarsus district of Mersin. The farm was built in the 1960s and was owned by the Kozacı family until the 2000s. It belongs to another family,

but its name remains "Kozacılar Farm". It used to serve an area of over 3500 decares, but now it serves an area of 2000 decares. Most of the land is now used for citrus orchards, but only cotton was produced previously.

Figure 85: Kozacılar Farm Aerial Photo, Firat, 2023

Figure 86: Kozacılar Farm Orthophoto, Firat, 2023

Four employees reside permanently on the farm. Previously, the house used by the farm owner has now been converted into the workers' lodgement. Although the farm owner resides in the nearby village of Atalar, an accommodation area is also available. Since the farm owners have a large family, it is operated as a corporate business. Although it is relatively new compared to most farms within the scope of the farm work, it has typological similarities with the farms built before the Republic era. As seen from the map below, Sapandere, Gürani, and Batakçı Kerim farms are located very close to each other on the GIS map below. We can say that this farm is a continuation of the widely accepted farm typology in the region. Like in other farms, the owner's house is located on the upper floor of the farm, but currently, this house serves as a lodge. In addition, there are work sheds, depots, an active courtyard kitchen, an office, and a small room for the farm owner's accommodation. The farm is rectangular and consists entirely of buildings. Before, the upper floor covering was not reinforced concrete but a wooden structure. In this renovation, the farmhouse owner's house was originally built over the entrance, like in Sapandere and Batakçı Kerim farms. However, later on, it was decided to build the house on the corner as it was structurally more suitable for concrete construction, as seen in the aerial photograph. The location of the stairs leading up to the house and the distance between the house are explained as follows. We consider this farm a continuation of the latest traditional building typology in terms of farms.

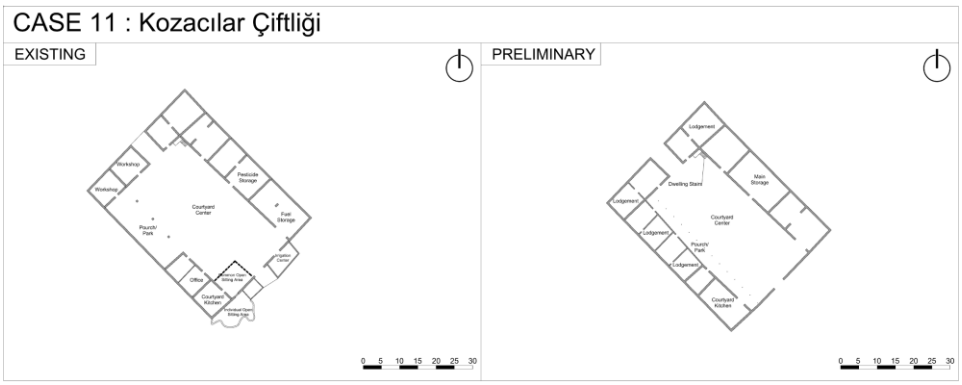


Figure 87: Kozacılar Farm Plan, Firat, 2023

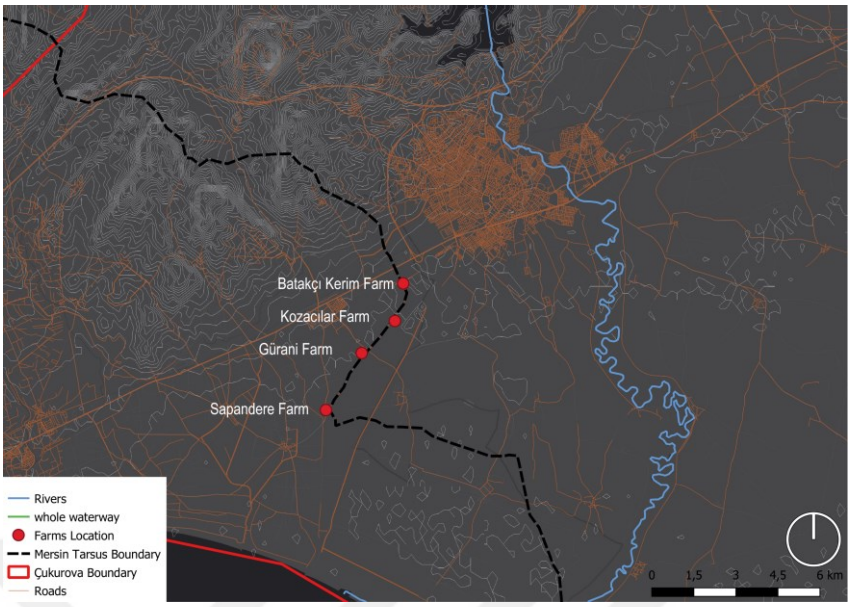


Figure 88: GIS Mapping, Firat, 2023

The main change in the farm is seen when the construction of reinforced concrete begins, especially all the lodging areas are converted to open storage. Only the oven in the farmhouse kitchen is broken, but the space still serves as a social area that works alongside the office to entertain guests visiting the farm. On the other hand, the building next to the kitchen has been built for the irrigation centre. The concrete roof of the farm has been covered with solar panels nowadays to provide electricity for the farm's irrigation systems. Other than that, the farm interior is mostly dedicated to agricultural work, but an outdoor seating area has been added on the exterior kitchen wall, which the farm owners and their families often visit. Even within a corporate-operated multi-owner farm, it is possible to observe the separation between life and agriculture within the scope of the thesis.

Figure 89: Courtyard Kitchen and Housing, Firat, 2023

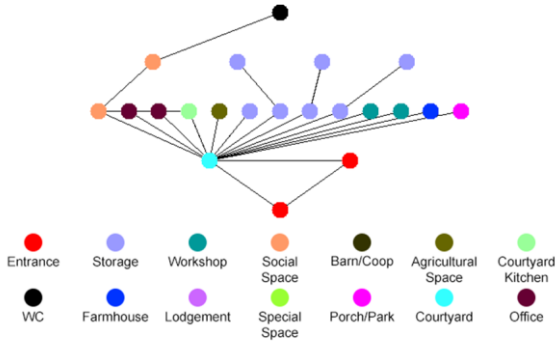


Figure 90: Kozacılar Farm Existing Situation Justified Graph

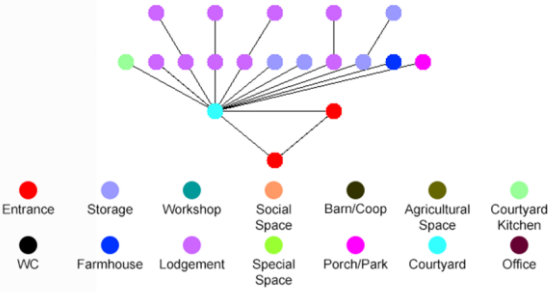


Figure 91: Kozacılar Farm Preliminary Situation Justified Graph

Additionally, the justified graph of the Kozacılar farm has been examined. Similar to the Batakçı Kerim farm, no major changes have been observed in the graphs. The lodgings on this farm have also been converted into agricultural spaces. Apart from that, in the present day, the high-depth level spaces in the farm are occupied by storage areas, social spaces, and restrooms instead of lodgings. Therefore, the significant aspect reflected in the graph of this farm is the functional transformation of spaces.

In the 1970s, the Kozaci family had the highest taxes in Mersin. They invested in different areas because the cotton sector was losing value, so they stopped farming. Even if the names of farms are not mentioned in the land records, they are used as directional references in the form of landmarks, one of Lynch's (1960) five elements, because there are few buildings in the Cukurova plain. Locations are described in the State Water Works document below, and Sapandere, Gürani, and Kozacılar Çiftliği have frequently mentioned farms.[30]

İçişleri Bakanlığından :

Karar Sayısı : 7845

1 — İçel İli'nin Tarsus İlçesine bağlı Nacarlı Köyünün Hacıtalip mevkiinde :

Doğusu : Devlet Demiryolu Köprüsünden başlayarak Nacarlı (Kölemusalı) deresini takiben Kozacı İbrahim Çiftliği,

Güneyi : Kozacı İbrahim Çiftliğinden başlayarak Devlet Su İşleri tarafından yeni açılan kanalı takiben eski su kanalı, devamla Sapandere Çiftliği yolundaki sakız ağacı,

Batısı : Sapandere Çiftliği yolundaki sakız ağacından başlayarak Sapandere Çiftliği yolu ve Devlet Demiryolunun birleştiği nokta,

Kuzeyi : Devlet Demiryolu hattı, devamla köprü olmak üzere,

Hükümetçe yeniden kurulan 4475 nüfuslu yerde «Huzurkent» adı ile belediye teşkili, 1580 sayılı Kanunun 7469 sayılı Kanunla değişik 7. maddesine göre uygun görülmüştür.

2 — Bu Kararı İçişleri Bakanı yürütür.

23/12/1969

CUMHURBAŞKANI
C. SUNAY

Başbakan
S. DEMİREL

İçişleri Bakanı
H. MENTEŞEOĞLU

Figure 92: Resmi Gazete, 1969

3.2.12. Case 12: Karmutoğulları Farm

Karmutogullari Farm is located in the Reşadiye neighbourhood of the Tarsus district in Mersin. The Karmutoglu family has owned the farm since the Republic era and currently serves on over 2000 decares of land. The farm produces peaches, citrus fruits, pomegranates, and corn. It was first built in the 1930s, but initially only had a lodging structure, and has now completely changed.

Figure 93: Karmutoğulları Çiftliği Orthophoto, Firat, 2023

Figure 94: Karmutoğulları Çiftliği Aerial Photo, Firat, 2023

On the farm, two employees reside permanently. Although the farm owners do not reside permanently, they are on the farm every day because the farm is located 15 minutes away from Tarsus by car, so permanent accommodation is not necessary for the farm owners. Additionally, since the farm is operated by four partners from the same family, the workload is shared, eliminating the need for permanent accommodation. There are two large warehouses, two workshops, a residence, an office, and a large shed for agricultural equipment on the farm. The workshops only serve as a space for classic American vehicles due to the personal hobby of the farm owner. Many farms have a variety of venues acquired from personal hobbies. Unlike other farms, the irrigation centre does not create a distinct space on this farm. They must transport portable irrigation systems as they do not obtain their irrigation from artesian wells. The farm courtyard forms a U shape, but it is not fully enclosed and, unlike others, does not have an entrance gate. The farm owners report that they do not feel any security concerns due to the presence of a permanent employee and up-to-date camera security systems.

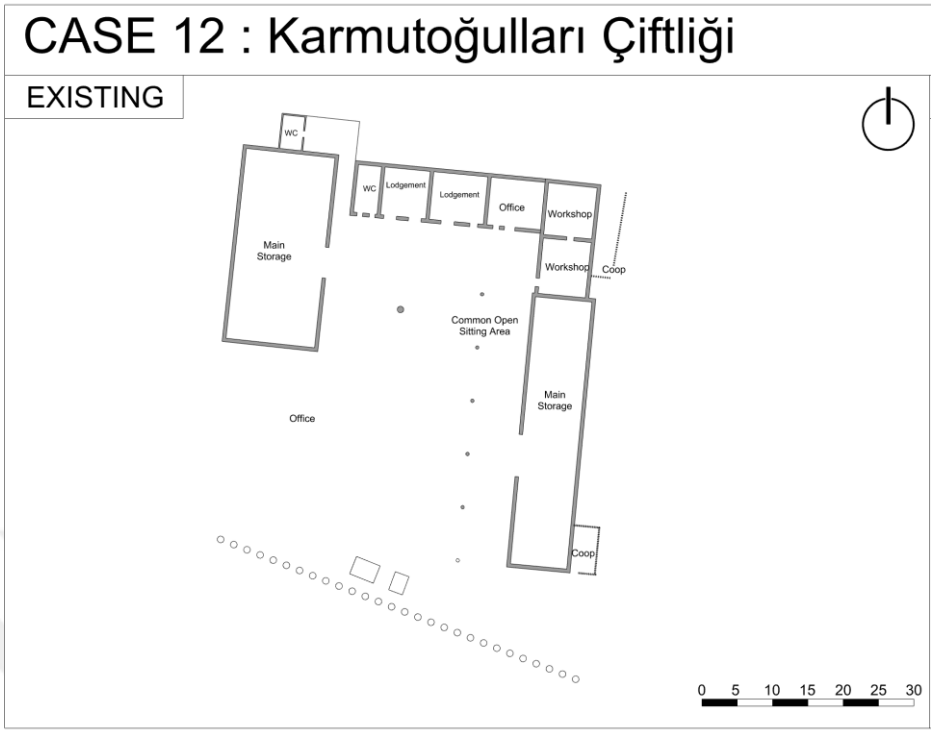


Figure 95: Karmutoğulları Farm Plan, Firat, 2023

Figure 96: Karmutoğulları Farm Courtyard, Firat, 2023

According to the plan, a masonry house was built for the farm owner in the area where the storage facility was in the top left corner in the 1930s. However, it was demolished and could not be drawn on the plan due to the lack of information. Next to this warehouse, the adjacent spaces are offices, housing, and workshops made of masonry construction and built in the 1940s. Another large warehouse was added in the 1990s. Since all these spaces were added one after the other, a courtyard was formed later, creating a natural courtyard formation that was not originally

planned. In addition, farm owners use the courtyard very actively for their work and hobbies, so they have provided shade and wind protection to the open south facade of the farm with pine trees. Therefore, we can say that the spatial role of the courtyard has been strengthened, and landscape elements rather than structures form the boundaries of the courtyard.

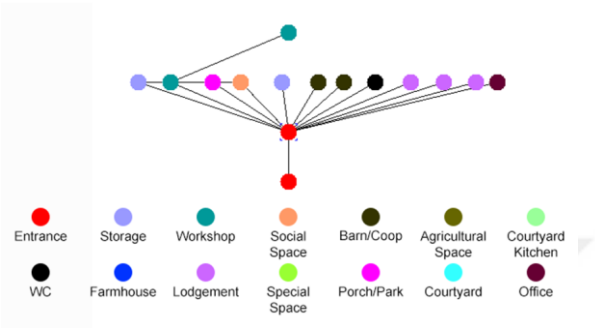


Figure 97: Karmutoğulları Farm Existing Situation Justified Graph

Lastly, the justified graph of the Karmutoğulları farm has been examined. Since it does not accommodate residential functions, all spaces are connected to the courtyard and do not exhibit depth. Only the workshop space shows depth, which can be attributed to the farm owner's personal hobby area. Generally, depth levels are not observed in farms where the number of residents is low and they primarily focus on agricultural activities.

3.2.13. Case 13 Ovadan Farm

Ovadan Farm is in the Adanalıoğlu Neighborhood of the Akdeniz district in Mersin. Since the farm changed owners a lot, we do not know how many owners it has had. We know that it was a farm before the Republic era. Currently, it serves 120 decares of land. However, since all these lands are greenhouses, operating costs and added value are high, and various vegetable varieties are produced out of season.

Figure 98: Ovadan Farm Orthophoto, Firat, 2023

Figure 99: Ovadan Farm Aerial Photo, Firat, 2023

In the current state of the farm, the employees and their families reside. The owner's residence is on the upper floor, but they do not permanently reside there. The farm's name is taken from Ovadan, a corporate legumes company, so the farm is a corporate enterprise. The architectural style of this building is very similar to the Sapandere and Batakci Kerim farms, but it has a slightly wider courtyard and more space than theirs. In the photo above, only one accommodation belongs to the owner on the upper floor of the farm. This area has four rooms,

one converted into a bathroom, while the other three are bedrooms. It has been observed that it has been converted without compromising its original form.

An office, a courtyard kitchen, and a dining hall are next to the courtyard entrance. This kitchen is still being used collectively, just like in the old days. The stairs next to the kitchen lead to the farmhouse owner's house. The direct correlation between the owner's house and the kitchen indicates strong social and spatial relationships. There are warehouses, workshops, and vehicle parks in the spaces seen on the north and south facades of the farm in the plans. One of the warehouses on the south facade has been converted into a cold storage room, as the previous owner produced roses in the greenhouses, and it was reported that this transformation was made for this reason. On the eastern front are residences for two families who work there, but these buildings were added later. It has been observed that one of the old residences is adjacent to the canteen and storage rooms. It is known that there were old marshy lands near the farm, and they were reclaimed with eucalyptus trees. That is why there are a few eucalyptus trees over fifty years old in the courtyard and surroundings of the farm. It has been observed that there are no shaded seating areas in the courtyard, such as gazebos, specifically designed for the courtyard, as it provides shade to almost the entire courtyard during the hot months.

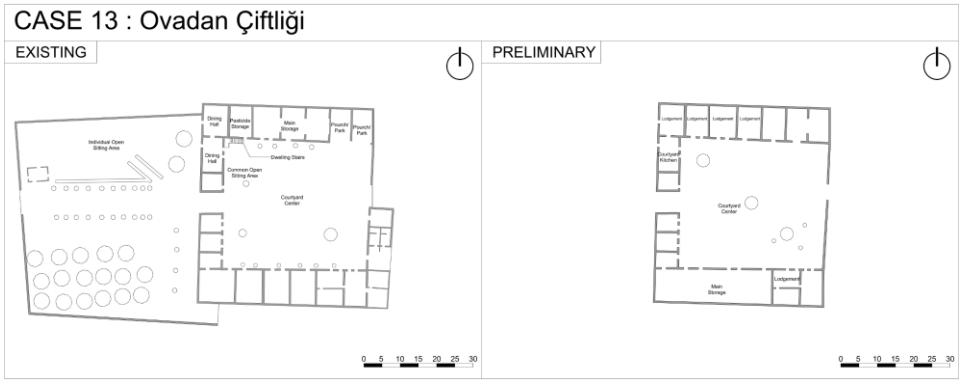


Figure 100: Ovadan Farm Plans, Firat, 2023

Figure 101: Ovadan Farm Housing of two facades, Firat, 2023

It can be said that the building typology and spatial organization of the farm have not undergone significant changes. The farm is a common area for many workers, so some lodgings are located in different parts of the farmland, but they use the farm as a workplace, gathering place, and dining hall. We only see the functioning of the collective designed in the old farms within the scope of work on this farm. Other than these, the most effective element that affects the farm spatially is creating a landscape area as large as the farm area, as seen on the plan. Previous owners used the farm as a living space more actively, so this area has seating areas, a swimming pool, and fruit trees. Furthermore, various landscaping elements have been placed along the gate leading to the farmyard to block the area where this pool is located visually, and these landscaping elements have made the road leading to the farmyard more defined.

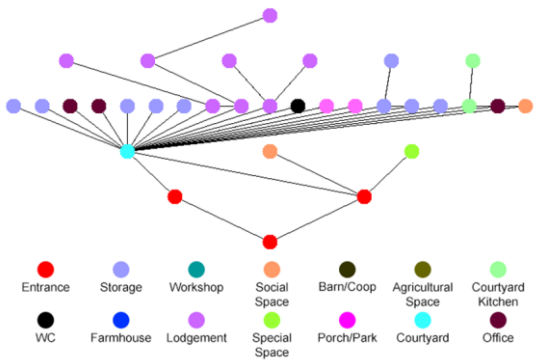


Figure 102: Ovadan Farm Existing Situation Justified Graph

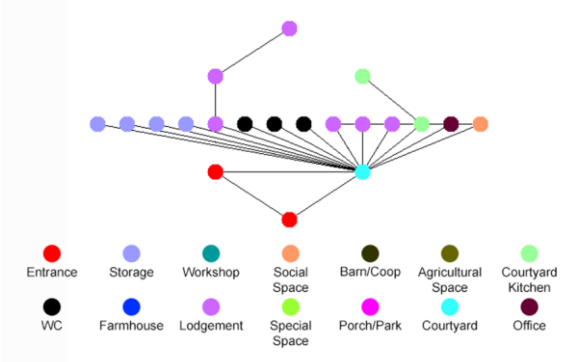


Figure 103: Ovadan Farm Preliminary Situation Justified Graph

Additionally, the justified graph of the Ovadan farm has been examined. The existing condition of this farm has directly added a level of depth due to the expansion of a large landscape area. Furthermore, although this farm is primarily for business purposes, the increased number of resident employees has led to various lodging depth levels in the existing state. Moreover, the only farm has transitioned from a more wheel structure to a star structure. Generally, the number of residents increases the division of spaces within the farm.

Figure 104: Personal Landscape Area and Entrance Road, Firat, 2023

In general, information about the history of this farm was obtained only about its architecture. Thanks to this farm, I could observe and understand the non-working areas and how they function socially in Sapandere and Batakçı Kerim farms. Even if the farm owner is not currently living on the farm, the fact that the previous owner's additions are still present has been

particularly helpful in understanding how personal and agricultural social environments can intersect.

3.2.14. Case 14: Historical Huzurkent Farm

This farm is located in the Nacarlı neighbourhood of the Akdeniz district in Mersin. The farm has changed hands many times. The owners have removed the 300 decares citrus orchards from the farm, so no active farming is being done. That means they have bought the farm as a real estate investment. Although it dates back to the pre-Republican era, it is the only farm near a residential area. Therefore, agricultural lands can be opened up for construction, and there is a possibility of increasing its value. After a flood in an area closer to the sea in the 1970s, disaster houses were built in this settlement, now called Nacarlı instead of Huzurkent.

Figure 105: Historical Huzurkent Farm Aerial Photo, Firat, 2023

Currently, nobody resides on the farm. There is only a caretaker who occasionally stays in the nearby settlement. They removed the citrus orchards three years ago because they found agriculture unprofitable as they were involved in different sectors and not actively engaged in farming. Therefore, they only rent out their land now. Since the farm is not in use, it is difficult to define its functions except for a few places. We could only identify one house, a stable due to the presence of troughs, and an open parking area.

Figure 106: Historical Huzrkent Farm Entrance, Firat, 2023

Figure 107: Historical Huzrkent Farm's Plan, Firat, 2023

There are many signs that the farmhouse, a limited structure, has transformed. The wooden roof structure has been replaced with a reinforced concrete flat roof, and some spaces have been converted into larger storage areas. Although it is not certain what the unchanged spaces with masonry walls were used for, it is understood that the housing area was the farm's old

kitchen due to the demolished oven. There will likely be a venue organization similar to the previous Ovadan Farm, but if there is a farm owner's house made of wooden construction on the upper floor, it is not possible to reach this conclusion with the data we have.

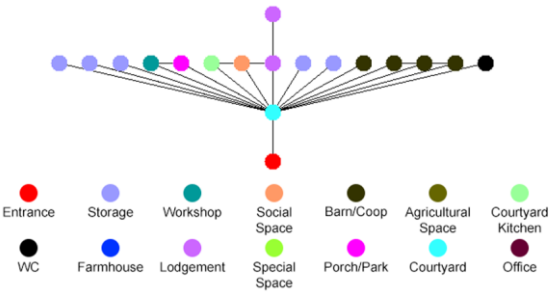


Figure 108: Historical Huzurkent Farm Existing Situation Justified Graph

Additionally, the justified graph of the Historical Huzurkent farm has been examined. Since no preliminary state is available, a direct comparison could not be made. As the farm remained unoccupied by the owner for a long period, it has transformed into a purely business-oriented farm. Consequently, it exhibits a very similar graph to farms like Karmutoğulları and Çaylaklar. However, unlike them, the spaces in the Historical Huzurkent farm have more connections among themselves, making it closer to a wheel structure.

Overall, we were able to gather very little data about this farm. However, it is clear that it has undergone a transformation and is located close to a settlement, which allowed us to study the transformed life and main venues on the farm. Therefore, the current state of this farm has the potential to provide sufficient syntactic data in conjunction with other farms in the study.

3.2.15. Case 15: Kubilay Farm

Kubilay Farm is located in the Adanalıoğlu neighbourhood of the Akdeniz district of Mersin. Before the farm, only a small warehouse and a 2-room lodge were built in the 1980s, but these areas were excluded from the scope of the study as they would not provide relevant data. The structures seen in the aerial photo below were built in 2013 and are the only new farm building

within the scope of the thesis. The land has belonged to the same family since the Republic era. Today, agriculture is carried out on 200 decares of citrus land, inherited over time.

Figure 109: Kubilay Farm Aerial Photo, Firat, 2023

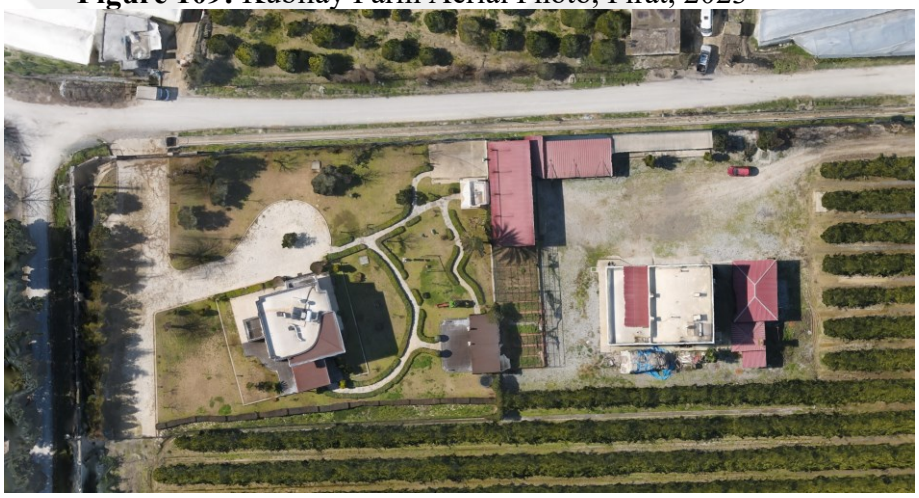


Figure 110: Kubilay Farm Orthophoto, Firat, 2023

Currently, the farm is inhabited by the owner's family and one employee. They have landed in different cities and are therefore considered a corporate entity. However, since there is a way of life on the farm and they are personally involved in agriculture, they share similar characteristics with family-owned farms. On the south side of the farm, there is a two-story house and a personal landscaping area belonging to the owners, completely separate from agricultural activities. There are various fruit trees, a barbecue area, a pergola, a children's playground, and a parking lot, similar to those found in detached houses in the city. The veranda in the courtyard

also serves as an open kitchen and functions like a courtyard kitchen in old farms. Structurally, there is a courtyard toilet beside the veranda.

On the other hand, within the agricultural area, there are two cross entrances and a main entrance from the main road. The lower floor of the structure depicted in the plan comprises a spacious storage area, a personal office, an engineering office, and restroom facilities. The upper floor has two apartment units. When we consider this group of structures together, we look at two separate functions in the space, but we can call it a farm.

Figure 111: Kubilay Farm Plan (Firat, 2023)

Since the farm does not have a history and is different from other farms worked on, it needs to be evaluated differently. First of all, there are very few new farm structures in Cukurova. Therefore, this farm serves as both a guide for transforming farm structures and an important example of a study to understand the definition of the farm. It can be said that the drawn personal and work situation on this farm has created both positive and negative situations. Especially in family businesses, there is often social and professional interaction with employees in a negative way. As the hierarchical situation reflects strongly on the space, it can negatively affect employee and boss relationships. Especially when the socio-economic gap between employees and employers is reflected in the workplace, it becomes difficult to balance work and personal life. That is why it has become difficult for farm owners to find families working in the apartments. Usually, single male workers want to reside, and a constantly changing employee turnover is generally undesirable. On the positive side, the fact that the family is not involved in agricultural work defines the workflow and the person responsible for agriculture more. This way, the farmer's

family can live a rural life like in the city. Especially the fact that the farm is half an hour from the city centre is an important factor.

Figure 112: Kubilay Farm Working Courtyard, Firat, 2023

Figure 113: Kubilay Farm Living Courtyard (Firat, 2023)

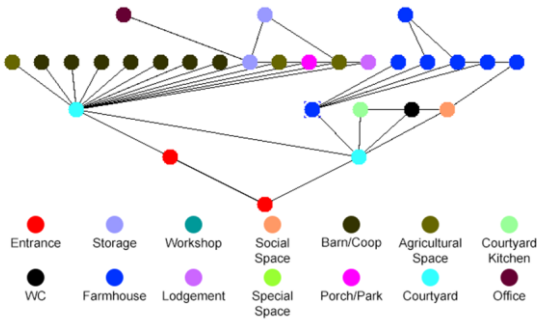


Figure 114: Kubilay Farm Existing Situation Justified Graph

Additionally, the justified graph of the Kubilay farm has been examined. We can say that this farm has the most distinct graph compared to others. This is because the two courtyards of the farm and their functions are directly separated into different branches. Although there is some connection between the two courtyards, there is no direct linkage between the spaces they connect. Therefore, looking at the functions, we can observe the distinction between the living courtyard and the working courtyard on the graph.

As a result, it is observed that collective living existed in the previous spatial organizations of all the old farmhouses within the scope of the study. It is observed that places with a working and hierarchical owner structure in old farms are integrated into today's conditions. However, clear boundaries are not created since these places are organically integrated. In other words, the purpose of the converted farms is to create transitional spaces between private life and agriculture. However, the main aim could be direct separation, like in the newly constructed farm. It could also be the desire for high socio-economic status farmers to have their farms resemble luxury villas in the city. Overall, this farm provides significant data to understand past farms and is an important example of how work and personal life can be separated.

3.3. Results of Chapter

This chapter aims to comprehensively investigate the intricate relationship between individuals and spatial configurations within the context of all case farms. Specifically, a meticulous examination of fifteen farms in the Adana and Mersin regions was conducted to gain a profound understanding of the interdependencies between people and space. Each farm was meticulously described to discern its unique attributes, encompassing current and historical appellations, geographical features, known construction dates, and land area. Analyzing the farms from human and spatial perspectives entailed investigating the farm's inhabitants, distinguishing between employees and employers, and identifying the adopted business models. Additionally, comprehensive details about building typology, spatial divisions, functional allocations, and utilization patterns, including any distinctive spaces, were provided. Delving into the historical background of these farms, the study elucidated the usage of specialized spaces and the influence of historical construction materials on the spatial milieu, drawing upon observational data and insights gathered through interviews.

The farms under investigation possess distinct characteristics, rendering them noteworthy in terms of regional agricultural heritage preservation and development. By scrutinizing these properties, the research yielded invaluable insights from multifaceted perspectives. The investigation revealed that the spatial elements of the farms have evolved due to diverse socio-economic and technological factors. Nevertheless, some farms embrace traditional structures, safeguarding the region's agricultural heritage.

Moreover, a comprehensive analysis of the justified graphs for all the farms was conducted to understand their topological characteristics. These graphs provided insights into the spatial relationships within the farms. Particularly, in farms with courtyards that date back to before 1900, all spatial elements were directly connected to the courtyard. Subsequent depth variations were observed in preliminary stages, while existing conditions displayed a transition towards a star and wheel structure, as described by Hiller and Yamu [45]. Although only one farm directly exhibited a wheel structure, the existing conditions of other farms indicated increased

connectivity, implying a transition towards a wheel structure. In other words, there was an increase in spatial connections within the farms. Two main reasons account for this phenomenon within the scope of this study. Firstly, with a decrease in the number of farm workers, there was a greater emphasis on connected spaces, reducing the number of specialized spaces. Secondly, as farm owners resided less frequently on the farms, a transformation towards functional spaces was observed.

Additionally, the overall number of defined spaces increased across all farms. Although this did not necessarily increase overall depth, specific spaces with increased depth were observed in contemporary times. That suggests a shift towards more intimate social areas, as reflected in the branching graphs with various depths, indicating a greater emphasis on personal needs rather than higher-depth spaces. In conclusion, the justified graphs provided a simplified understanding and comparison of the spatial connections within the farms, enabling valuable insights for further analysis. Furthermore, this research emphasizes the significance of comprehending the intricate bond between individuals and spatial arrangements within the agricultural domain. Particularly, the study underscores the pivotal role of courtyards as organizational spatial components within the farm structures in Çukurova. The courtyard facilitates spatial relationships, and its salience as an organizational element is evident in these farms. Additionally, the study uncovered the inescapable convergence of work and personal life within the farm's work environment.

In summary, this study offers invaluable insights into the nuanced relationship between individuals and spatial configurations within farms in the Adana and Mersin regions. The detailed description of the fifteen farms examined in this research provides indispensable data to inform future research endeavours and foster regional development.

CHAPTER IV

METHODOLOGY

The method of this thesis is mainly examined under two separate headings. The first heading includes field studies, while the second heading includes the analysis method of the data obtained in field studies.

The first heading concerns field studies, including farm selection, drone photography, reports, and the processing of these farms. These stages form the basis of the thesis methodology, especially in understanding the farm location, determining its users and needs, and understanding its organization and functions. Especially since field studies are conducted alone, the selected methods are determined to use time well and produce the most detailed analysis data.

The methodology's second heading includes the data analysis in line with the plans and information produced in the first part. In this section, firstly, the common social and spatial features of the farm locations in Cukurova are interpreted in line with the information obtained from the field. Then, with the help of the Syntax2D program, the farms are syntactically analyzed and interpreted mutually with their preliminary conditions and qualitative information obtained from the field studies.

The methodology of the thesis will be explained in detail in the following subsections.

4.1. The Documentation Method in Field Study

The fieldwork constitutes the most critical part of the study within the scope of this thesis. That is because there are numerous farms in Cukurova. These farms vary depending on the land they serve, their employees, business models, construction dates, and the products they produce. Therefore, selecting farms is an important step before starting fieldwork. Currently, most of the land in Cukurova is used for orchard farming. Therefore, farms that specialize in orchard farming have been selected. As part of the study, attention has been paid to selecting farms at least fifty years old to examine their transformation; because most of the farms currently used for orchard

farming used to be used for field agriculture, which is a very important factor in analyzing the transformation of farms.

Additionally, landowners with 150 decares or more of land, as determined by the Ministry of Agriculture and Forestry, are classified as large farmers. Therefore, farms serving 150 decares of land or more have been included in the scope of work for the functions to be shared. This factor is important for the distinction between farms and rural homes.

In this regard, many farm owners were consulted. Permission was obtained from about over twenty farm owners to do fieldwork on their farms. However, due to various personal reasons of the farm owners, fieldwork could only be done on seventeen farms. These seventeen farms met the required criteria. You can see the characteristics of these seventeen farms in the table below (Table 1). As a result of the work, two farms marked in red on the table (Table 2Table 1) had to be excluded from the scope of work. The Historical Horse Farm was involved in professional racehorse breeding, so the farm's land was very large and contained many areas unrelated to the research scope. Another farm, Akgün Farm, was engaged in dairy farming outside of agriculture, so it had to be excluded from the scope of work containing many different functions. The plans and visuals of these farms (Figure 114 & Figure 115) are shown in the visual below. As a result, fifteen farms were included in the scope of work.

Table 1: Case Farms

Case	Exiting Walkable Area	Preliminary Walkable Area	Year	Courtyard Type
Utanç Farm	3739 m²		1830s	Courner Courtyard
Sapandere Farm	4196 m²	2673 m²	1850s	Central Couryard
Mustafa Gazi Fırat Farm	4444 m²	1284 m²	1952	Seperated Courtyard
Özgiray Farm	2810 m²	2662 m²	1930	Central Couryard
Yolaçan Farm	3548 m²	3578 m²	1930	Central Couryard
Çaylaklar Farm	2334 m²		1930	Courner Courtyard
Gürani Farm	2143 m²	2088 m²	1930	Central Couryard
Sarıköşk Farm	3763 m²		1930	Central Housing
Eski Teke Farm	915 m²	918 m²	1930	Courner Courtyard
Batakçı Kerim Farm	2764 m²	2779 m²	1938	Central Couryard
Kozacılar Farm	1857 m²	1752 m²	1955	Central Couryard
Karmutoğlulları Farm	3700 m²		1930s	Central Couryard
Ovadan Farm	4805 m²	2353 m²	1850s	Central Couryard
Huzurkent Tarihi Farm	1623 m²		1850s	Central Couryard
Kubilay Farm	6243 m²		2014	Seperated Courtyard
Historical Horse Farm	7738 m²			
Akgün Farm	11164 m²			

Figure 115: Akgün Farm, Plan & Photo

Figure 116: Historical Horse Farm, Plan & Photo

The field study consists of three main parts. In the first stage, farm owners thoroughly visited all farms and facilities. In the second stage, hundreds of photos of the farms were taken with a camera and a drone. These photos were used to create photogrammetric 3D models, and plans were drawn. In the final stage, interviews were conducted with the farm owners based on predetermined questions.

Firstly, all the premises of the farms were visited, and the farm owners noted down their names. Farms plans were sketched and named before photography began. Based on the sketches seen in the drawings (Figure 117), the planar layouts of the interior spaces of the farms were

understood. During these visits, any demolished, added, or changed premises were added to the sketches based on observations and indications from the farm owners; since the photogrammetric 3D models obtained from the photographs do not include interior spaces. Therefore, doors and openings were particularly emphasized in the sketches; before the farms' plans were drawn in the computer environment, the openings and doors in the 3D models were used as references, and the plans were drawn based on the sketches. Afterwards, reference measurements were taken from the sketch (Figure 117) for scale verification during the drawings. These measurements were chosen to be as long as possible and visible in aerial photographs. As seen in the sample sketch, two diagonal measurements were taken from the courtyards of the farms.

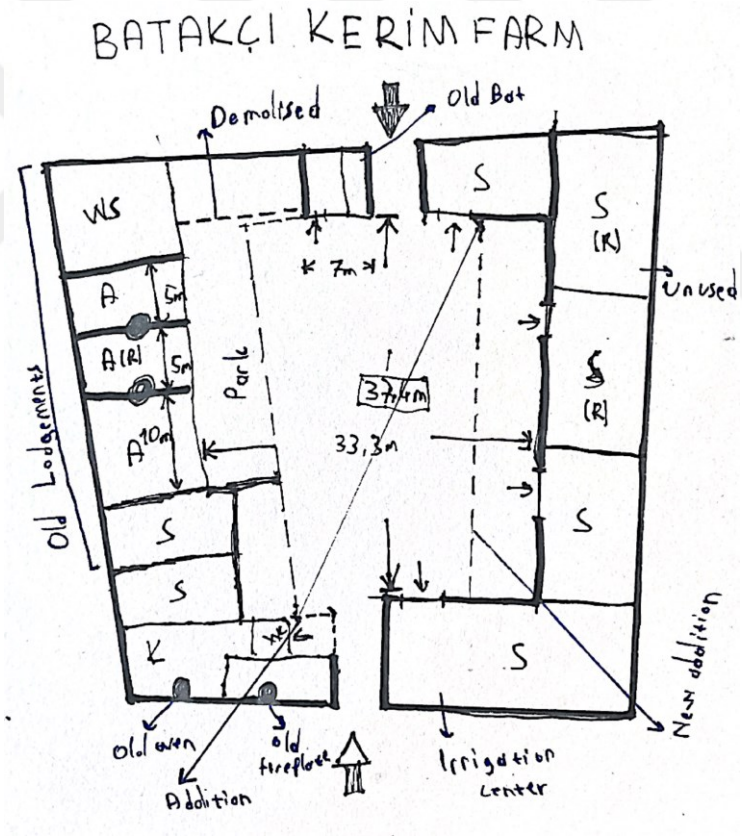


Figure 117: Field Study Sketch

Photography began with indoor spaces to capture changes observed in the spaces and keep them as data. Later, drone photography was used with the DJI Mavic Air 2 drone. First, the farms were photographed from a height of approximately 50 meters and at a right angle to create a scaled image of their layout. This photography was done autonomously using the "Copterus"

drone application. As seen in the image below, for an orthographic and mosaic merged image, each photograph taken at each point must overlap with the other eight neighbour photographs at a rate of 30%. If fewer photographs are taken, the resulting image will be distorted.

On the other hand, for a three-dimensional accurate scale image, photographs must overlap by at least 50%. Therefore, a 75% overlap rate was set vertically and horizontally, as seen on the interface of the "Copterus" program (Figure 118) to produce high-resolution and accurate models, and applied to all farms. Afterwards, to obtain the vertical building views of the farms, the automatic photographing feature was activated every 3 seconds on the drone interface, and the drone was manually rotated in a circular motion around each structure. While this circular rotation could also be done autonomously using the Copterus application, better results were obtained manually to capture desired details from different heights. Since the coordinates obtained through GPS were embedded in all drone photographs, photogrammetric models with 90-95% accuracy were possible. Finally, photographs were taken from the entrances and beautiful angles of the farms in a 48-megapixel mode for use in the thesis, and the photography study was concluded.

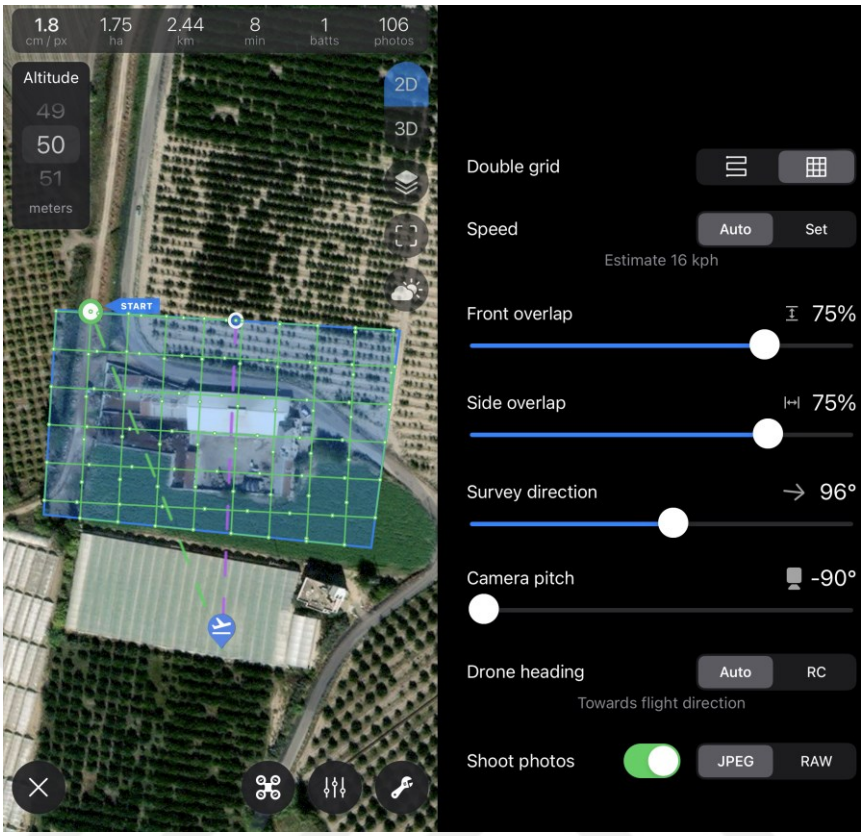


Figure 118: Copterus, Drone Application

At the end of the field study, various notes were taken by asking the questions seen in the table (Table 2) to the farmers. In this way, data that cannot be obtained from the plan and observations, such as social situations, agricultural production, and personal information, was obtained.

Table 2: Field Study Questions Table

Question No	Questions About Existing Situation
1	What year was the farm built?
2	Who are the farms and how many people are residing at the moment?
3	How many decares of land do you have?
4	Are you a family business or a company?
5	How many partners do you have?
6	What are you doing agricultural production on?
7	Which rooms did you add later? From where ?
8	Where do you spend your time on the farm on a daily basis?
9	Are your employees satisfied with the farm environment and lodgings?
10	Do your employees stay with their families or alone?
11	Turkish or foreign national?
12	What agricultural equipment have you purchased in the last 10 years?
13	Are you thinking of expanding your farm or lands?
14	Which rooms or areas will you expand on your farm?
Question No	**Questions About Preliminary Situation**
1	How many decares of land were previously attached to the farm?
2	Which owner of the farm are you?
3	Did you inherit or buy it?
4	Was there a courtyard kitchen?
5	Are there any rooms that were previously lodging and are now changing?
6	Which agricultural product was produced before?
7	How many people lived on the farm before?
8	How many are employee and how many are farm owners?
9	Where did they get clean water?
10	Where do people spend their free time?
11	Where was the food eaten?
12	How were the fields irrigated?
13	What year did you switch to horticulture?
14	What year did you switch to drip irrigation?

4.2. Post Field Study Production

Another study was conducted to convert the mosaic orthophotos and 3D models obtained from the fieldwork photos taken. To achieve this, two separate programs were used. The first program is "WebODM", designed to process drone images. The second program is "RealityCapture", only a photogrammetry application. One of the two programs would have been sufficient for the study. However, if the taken photos did not contain GPS coordinates with full accuracy, WebODM would give an error and fail during the processing. This GPS data situation was variable depending on the weather conditions, time of day, and the number of satellites the drone could connect to obtain GPS data.

On the other hand, the RealityCapture program could produce a 3D photogrammetric model independent of GPS data. The main difference is that if there is no GPS data,

RealityCapture produces a model with an uncertain scale, while WebODM produces a fully proportional model. Thanks to the reference measurements in the fieldwork sketches, farm photos with missing GPS data were converted to full-scale 3D models.

In the WebODM program, as seen in the figure below (Figure 119), a simple interface greets the user. When the "Add Project" button in the upper right corner is clicked, a file is opened for the images to be processed, and when the "Select Images and GCP" button is clicked, the model's resolution settings are entered. The processing is started with the "Start Processing" button. If the resolution of the production model is selected as high, the process can take days, so default settings are always used. An average of four hundred photos were taken for each farm. The process in WebODM is CPU-based and takes about 1-2 hours on average. As a result, we can obtain the 3D model in the figure below (Figure 120).

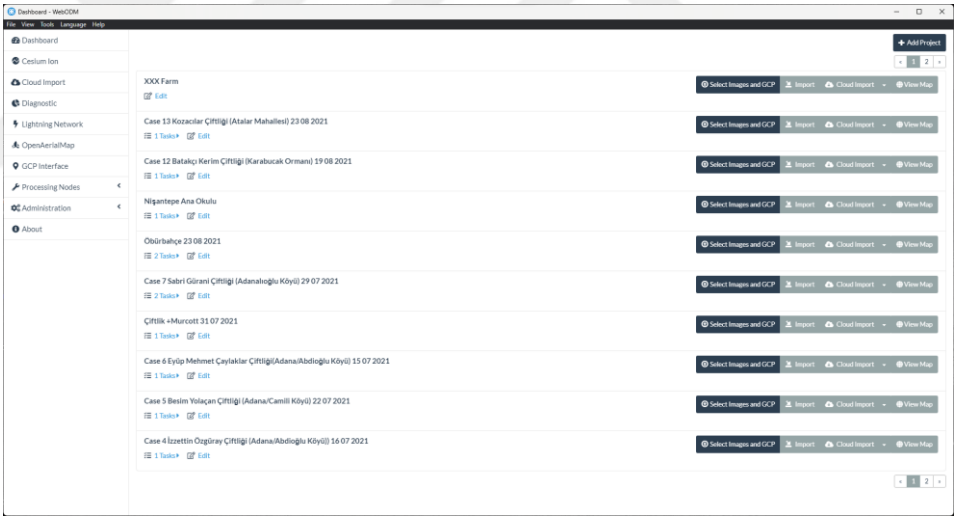


Figure 119: WebODM Interface

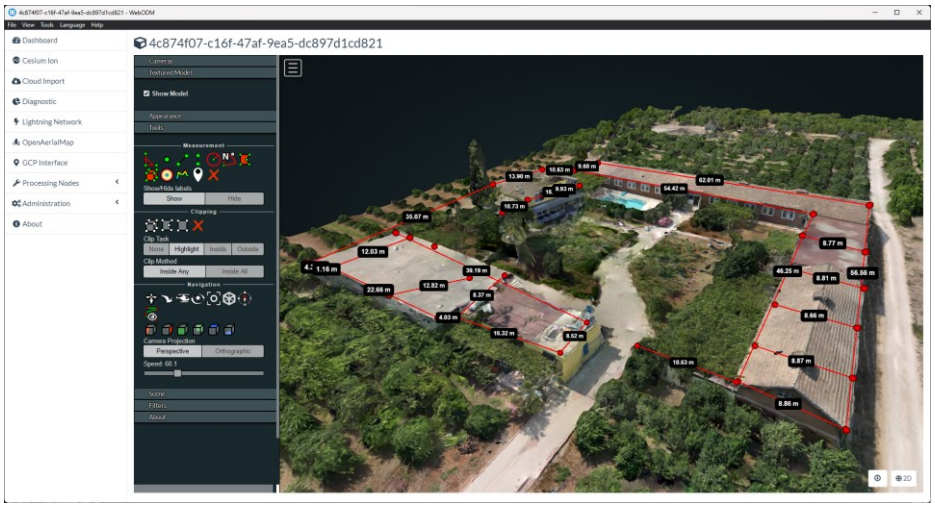


Figure 120: WebODM After Process Result

The Reality Capture program presents a more complex interface with more settings than "WebODM". Clicking on the "input" icon on the top left, select the photos of the farm to be processed. Afterwards, detailed settings can be made in the process tab. Still, a correctly scaled 3D model is sufficient for the work and enough to start the process by default, as high-resolution textures are unnecessary. As a result, we can obtain the 3D model in the second figure below.

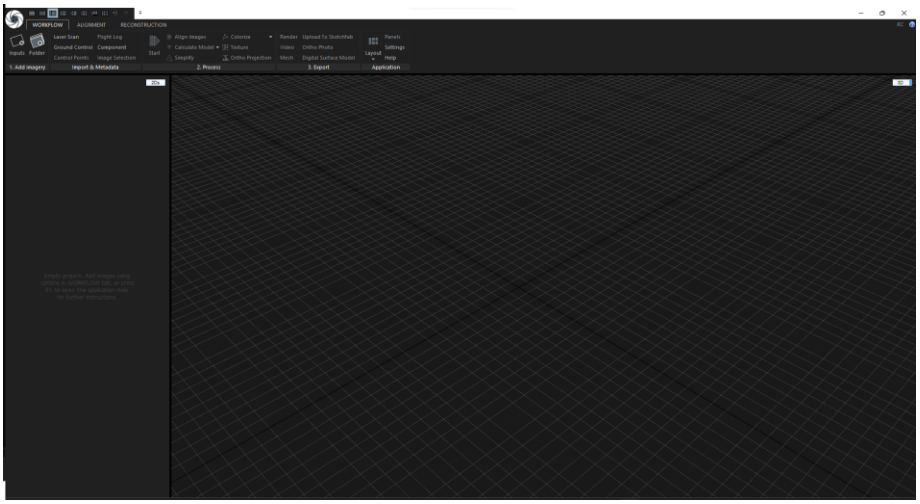


Figure 121: Reality Capture Interface

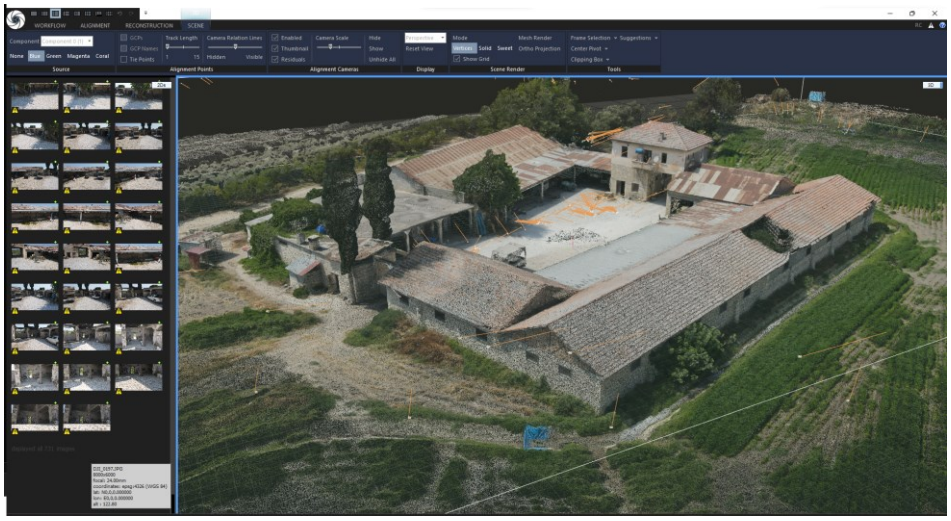


Figure 122: Reality Capture After Process Result

Moreover, these obtained three-dimensional models are exported in ".obj" format and imported into the "rhinoceros" program. If the model is not full-scale, reference points seen in the selection in the figure (Figure 123) are used to draw lines, and the model is scaled by entering the reference measurement by selecting the line and the model. Then, a one-meter topography of the model is extracted. The "contour" command is used, and 1 meter is selected for one-meter topography. As a result, the shape seen in the middle of the figure (Figure 124) is obtained. Although it varies depending on the roof height of the farms, the contour at 1-2 meters above the ground level is selected. The figure (Figure 125) below shows that the selected contour almost completes the plan. As seen in the figure (Figure 125), the curves obtained from the contour are

linearized with red lines. Then, the inner plan lines are selected with green axes and drawn according to a finished plan.

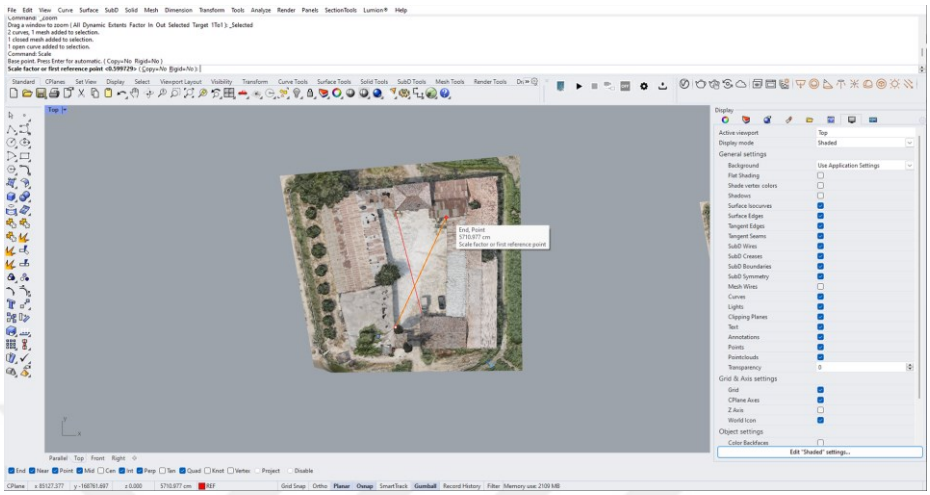


Figure 123: Reference Lenght Scaling

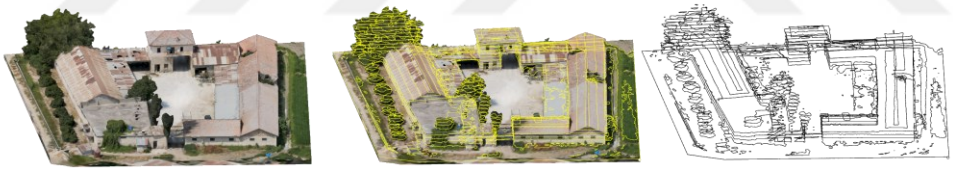


Figure 124: 3D model to 2D contour process

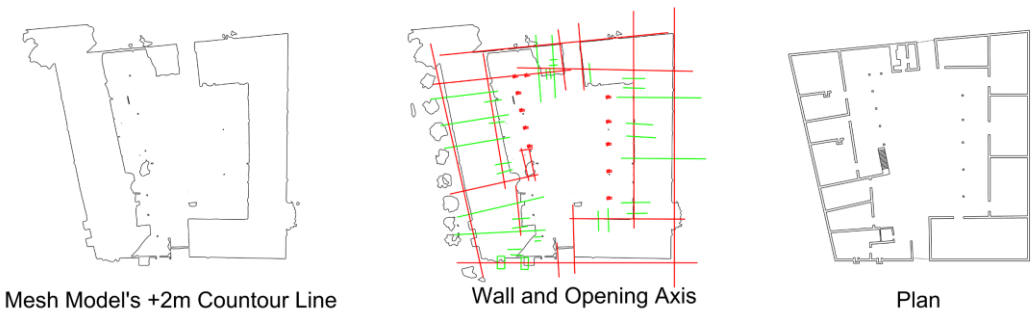


Figure 125: Contour line to plan process

Farm plans with up to 95% accuracy could be drawn with this method. Since the plans will be used for description and space syntax analysis, there was no need for a survey with 100% accuracy plan drawing. Therefore, drawing the farms' plans with this method is sufficient.

As a result, the planned production work started with a drone, and a camera was suitable for the project scope. It was impossible to occupy the farms with survey work for days as agricultural work continued, and there was private life on the farms. In addition, it did not seem possible to do conventional survey work alone. The survey method is ideal for a researcher conducting fieldwork alone on big structures like farms over 1000m2; using the traditional survey method alone would require significantly more time per farm.

4.3. Analysis Method

There are two main stages in the analysis method. The first stage involves observations and interviews in the farms, which is a qualitative analysis, while the second stage involves space syntax analysis based on the generated plans.

4.3.1. Quantitative Analysis

For the first stage, priorities were established by visiting all farm locations and creating location lists. The common and special spaces in all farms were identified in these lists. Moreover, the questions in the table (Table 2) at the beginning of the methodology section were addressed by farm owners in a question-and-answer format. As a result of these question-and-answer sessions, the social and spatial characteristics of the existing and preliminary situations of all farms were determined. Detailed information could not be obtained for each farm, so preliminary plans could not be drawn, and clear information about the previous social life could not be obtained. The obtained information was explained in the analysis and "Case" sections under "Cukurova".

Two separate situations were addressed in the analysis and the case sections. At the same time, the cases section explained the locations of farms, social life, agricultural practices, user information, farm visuals, and plans. Common and special situations were interpreted in the analysis section due to all the cases section's explanations. This interpretation focused on locations and user relationships and proceeded in two separate ways. In the first section, the

agricultural spaces, social spaces, and private spaces in the existing situations of farms were individually interpreted and explained in terms of their users, usage purposes, and common and differing space characteristics of the farms. In the second section, the focus was on changes in the preliminary and existing spaces. Here, active spaces, new agricultural spaces, new social spaces, and disappeared or non-functional spaces were interpreted in terms of social and agricultural changes. The common and changing aspects of currently active spaces were explained. The reasons for the need for new spaces and the transformations that led to the addition of these spaces were interpreted. The disappeared/non-functional spaces were interpreted based on social and technological changes.

Overall, this analysis section contains deductions based on observations and what farm owners have indicated.

4.3.2. Space Syntax Analysis

This section will explain how space syntax analyses were generated and compared with qualitative conditions. Firstly, the plans of the farms are necessary for syntax analyses, and in the previous section, how these plans were produced was explained. Then, the "Syntax2D" program was used to obtain syntax data from these plans and table them in Excel. These tables were interpreted with various histograms according to the qualitative features of the farms.

Firstly, the plan drawings of the farms in the scope of the study need to be prepared for the "Syntax2D" program. Since the plan needs to be completely drawn within closed boundaries in the Syntax2D program, the outer walls and openings of the farms should be closed polylines. In addition, if the wall thickness is visible on the outer walls, since these thicknesses can be seen as Syntax2D analysis areas, they need to be converted into one-piece polylines by removing them. After these operations, if the output is taken in dxf format, the plan becomes ready for Syntax2D. The plan prepared for normal and Syntax2D is below (Figure 126).

The "Syntax 2D" program developed by the University of Michigan was used to perform syntax analyses in this study. The "Syntax 2D" program performs calculations based on a logic

constructed on "isovist" areas [39],[40]. The convex space concept, discussed in the theory of spatial sequence, reduces plans and areas of different sizes that will be analyzed into cellular space.

The analysis of Syntax 2D is based on isovist areas. The isovist area is the definition of all the areas that can be visually dominant when a person rotates 360 degrees around himself while standing still in any space. Each point where a person stands still has a different isovist definition. These values can be used to understand and measure the relationships between different cellular spaces in the plan we want to analyze. Within the definition of the isovist area, walls, objects and other systems that obstruct our view in space are considered obstacles and affect the determination of the isovist area. Starting from the isovist basis, Syntax 2D asks us to define the boundaries of the plan we want to analyze and its obstacles. By defining the boundary (outer walls and analysis boundary) and wall (inner walls and obstacles), the main impact area to be analyzed is determined, and the physical space relationships within this area are investigated. The program, which works with a grid system, calculates the physical space relationships within the analyzed boundaries according to the isovist area and grid divisions after determining a grid for this impact area. These calculations are made using the plans in the dxf format mentioned in the previous paragraph. The program's interface is shown in the figure below (Figure 127).

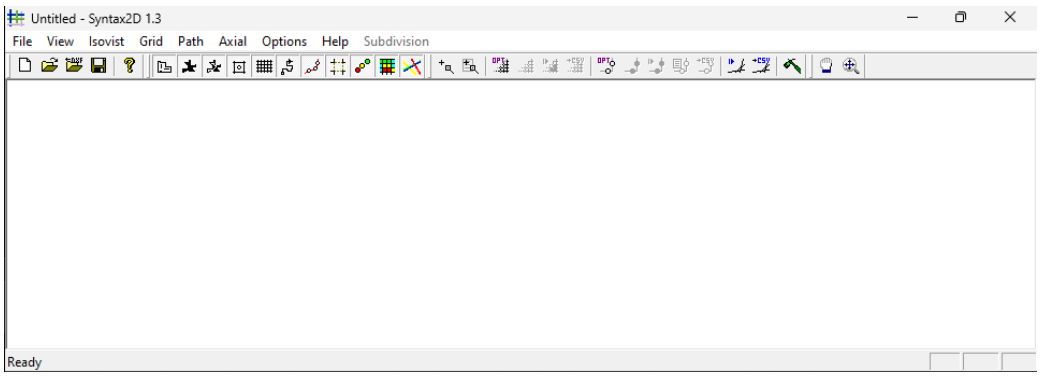


Figure 126: Syntax2D Interface

A program that works by partitioning the grids has been introduced. It allows for the comparison of plan examples from different farms. The program calculates the smallest grid piece

definition for the area of the main effect digitally. The plans are drawn in Rhino Ceros format and exported in ".dxf" format. They are then transferred to the "Syntax 2D" program in proportion to the plan dimensions. As a result, the "smallest grill piece" that the program calculates for the area in the main effect has been made the same for all farms. If different-sized grids were defined when comparing farms within themselves, the values' results from the same point would differ.

For this reason, each grill was determined as one square meter. The farms' average area was 2300 square meters, so the calculation time was 30-45 minutes per plan. Since the program is CPU-based, it took longer than today's GPU-based computing tools.

When running the program, first, the dxf file is loaded. After the DXF file is defined, the definitions seen in the figure (Figure 127) below are required. If wall and boundary layers are defined with the same name in the drawing program, Syntax2D can automatically detect it.

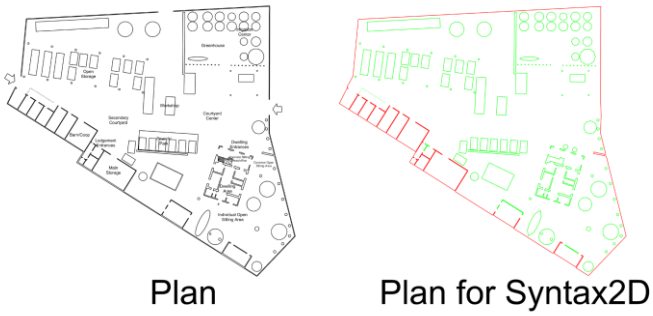


Figure 127: Plan to Syntax2D Plan, MGF Farm

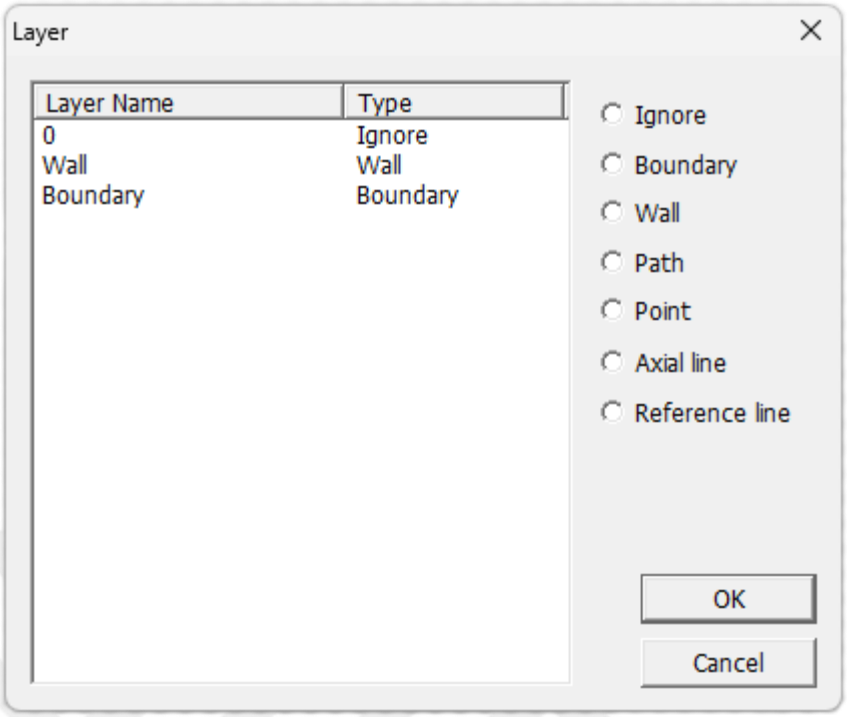


Figure 128: Syntax2D Defining Plan Layers

Later, we encounter the tab shown in the figure below (Figure 129). Here we select the measurement unit as meter and the isovist calculation method as approximate radial and proceed.

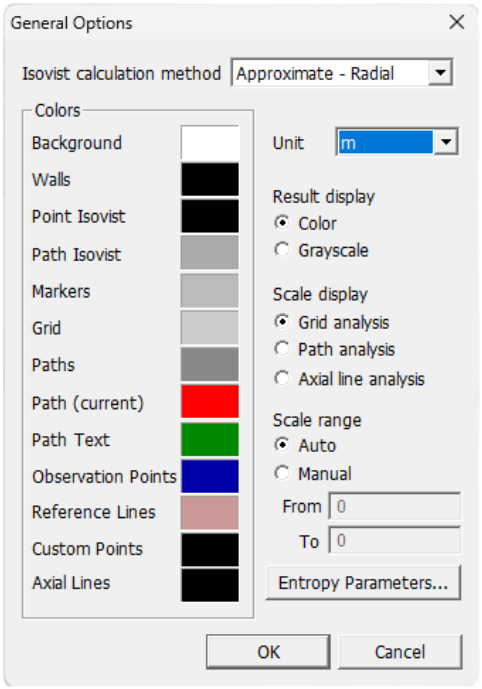


Figure 129: General Options of Syntax2D

Next, we need to define the grids in the following step and enter "100" as the span size value, as seen in Figure (Figure 130). We must also mark "calculate graph measures" to calculate the integration, mean depth, and connectivity values. That will result in obtaining a plan divided into grid sections, as seen in the figure.

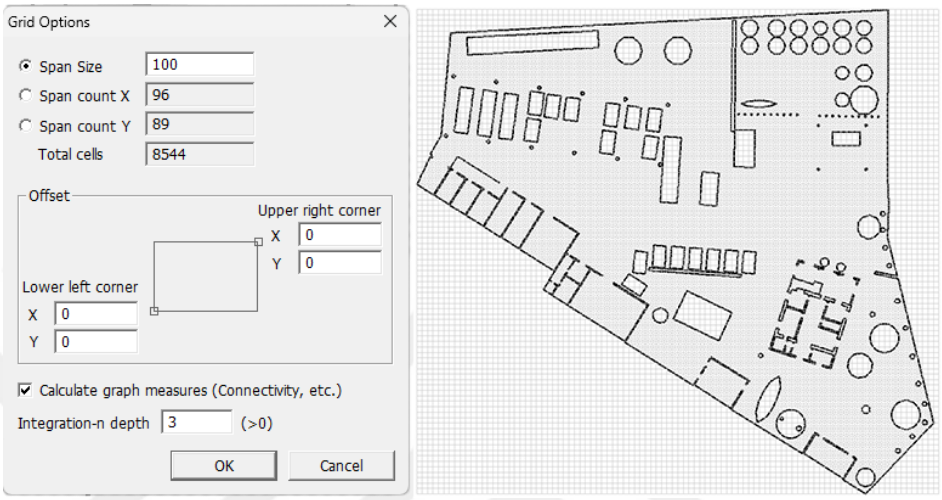


Figure 130: Grid Options of Syntax2D

At this stage, we start the calculation and are presented with a plan isovist area graph, as shown below (Figure 131). If we select a point, the visible areas from that point are displayed in black. When we want to see all the syntactic values at the same point, all the values in the table below are displayed.

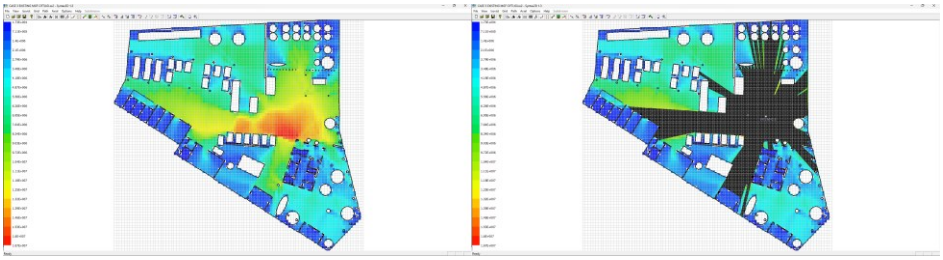


Figure 131: After Process Result of Syntax2D

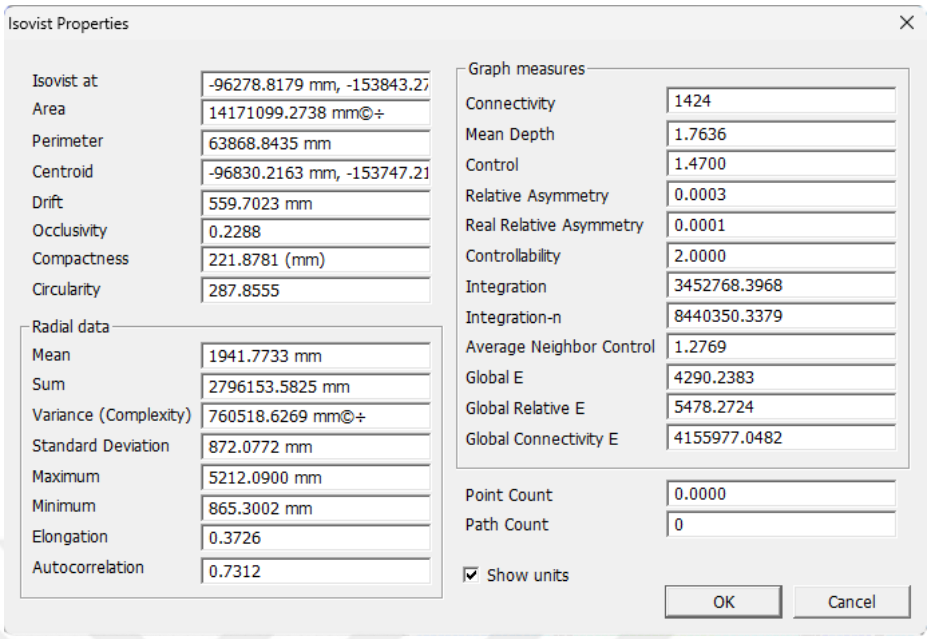


Figure 132: All Syntactic Values of Selected Grid Piece

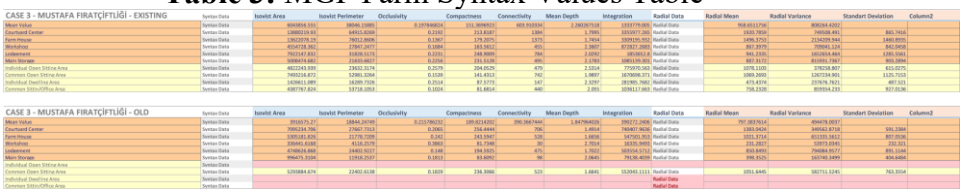
This study has made it possible to compare isovist area, isovist perimeter occlusivity, integration, mean depth, connectivity, radial mean, and radial variance values in the plan layout. That is an important assumption for the logic of comparing numerical values.

Common areas on the farms have been identified to obtain values from the created Syntax2D analysis. These areas include the courtyard, farmhouse entrance, lodgement entrance, workshop, main storage, and total mean cell. In addition, four special areas have been added: individual open sitting areas, common open sitting areas, individual dwelling areas, and common sitting/office areas. The centre of the courtyard area has been used to obtain the value. Values have been obtained from the entrances of the farmhouse and lodgement areas because the interior spaces will not provide significant data within the scope of the study, as the organization of these areas in the farm needs to be examined.

Additionally, it is important to note that no common situations were observed between lodgings or farmhouses. If multiple lodgings show different values, the average of all their values has been taken. Values have also been obtained from the entrances of the workshop and main storage areas. As most farms have multiple main storage areas, the average of their values has been taken and tabulated. Finally, values have been obtained from the centres of social areas. As

a result, tables have been obtained for every farm that includes all areas and selected parameters for their preliminary and existing conditions as follows:

Table 3: MGF Farm Syntax Values Table



CASE 3 - MUSTAFA FIRATÇİFTLİĞİ - EXISTING	Syntax Data	Isovist Area	Isovist Perimeter	Occlusivity	Compactness	Connectivity	Mean Depth	Integration	Radial Data	Radial Mean	Radial Variance	Standart Deviation	Column2
Mean Value	Syntax Data	4040856.333	38046.15885	0.197846824	131.3699672	469.910334	2.280267518	1333779.005	Radial Data	958.6511756	808264.4202		
Courtyard Center	Syntax Data	1588010.95	64455.8269	0.2182	213.8187	1384	1.7995	1010977.265	Radial Data	1020.7858	748008.491	865.7414	
Farm House	Syntax Data	1362078.19	76012.8606	0.1367	179.2075	1375	1.7854	1009195.952	Radial Data	1496.3753	2134209.944	1460.8705	
Workshop	Syntax Data	4054728.361	27467.2977	0.1684	163.5812	455	2.3807	972817.2883	Radial Data	867.3979	709641.124	842.3458	
Lodgement	Syntax Data	7921147.832	31828.5173	0.2231	248.9809	784	2.0292	1853653.8	Radial Data	941.2335	1652654.464	1285.5561	
Main Storage	Syntax Data	5008474.682	21633.6827	0.2258	231.5139	495	2.1763	1085135.301	Radial Data	887.3172	815955.7347	903.3994	
Individual Open Sitline Area	Syntax Data	4822243.939	23632.3174	0.2579	204.0529	479	2.5314	779970.563	Radial Data	1078.1105	378258.807	615.0275	
Common Open Sitline Area	Syntax Data	7495218.872	52981.3264	0.1539	141.4313	742	1.9897	1670698.371	Radial Data	1089.2600	1267234.901	1125.7153	
Individual Dwelling Area	Syntax Data	1429611.089	16289.7326	0.2514	87.5773	147	2.3297	281901.7682	Radial Data	475.4374	237676.7621	487.521	
Common Sitin/Office Area	Syntax Data	4387787.824	53718.1053	0.1024	81.6814	440	2.055	1036117.663	Radial Data	758.2328	859554.235	927.0136	

CASE 3 - MUSTAFA FIRATÇİFTLİĞİ - OLD	Syntax Data	Isovist Area	Isovist Perimeter	Occlusivity	Compactness	Connectivity	Mean Depth	Integration	Radial Data	Radial Mean	Radial Variance	Standart Deviation	Column2
Mean Value	Syntax Data	3916575.27	18844.24749	0.213786232	189.8214202	390.3667444	1.847964036	390272.2436	Radial Data	797.1837614	494478.0037		
Courtyard Center	Syntax Data	7095234.706	27467.7313	0.2065	258.4444	706	1.4914	743407.9636	Radial Data	1383.0424	349562.8718	591.2384	
Farm House	Syntax Data	3305181.829	21776.7288	0.242	243.5947	528	1.6898	547501.953	Radial Data	1021.3714	651355.5612	807.0536	
Workshop	Syntax Data	3304413.8188	4116.2579	0.3863	81.7349	90	2.7014	18370.9495	Radial Data	231.2827	53973.0545	232.3211	
Lodgement	Syntax Data	6748626.868	24402.9227	0.148	194.5925	475	1.7022	503504.5712	Radial Data	850.8495	796084.9577	891.1166	
Main Storage	Syntax Data	996475.3104	11918.2507	0.1013	83.6092	90	2.0645	79136.4099	Radial Data	398.9325	167740.3499	409.6404	
Individual Open Sitline Area	Syntax Data												
Common Open Sitline Area	Syntax Data	1293884.674	23402.6138	0.1829	236.3066	523	1.6841	512043.1111	Radial Data	1051.6445	582711.5245	763.3554	
Individual Dwelling Area	Syntax Data								Radial Data				
Common Sitin/Office Area	Syntax Data								Radial Data				

All the data of the farms have been tabulated in the analysis sections. These tables have enabled the creation of various histograms. The following histograms have been defined:

a. Total mean cell preliminary and existing bar graph
b. All areas existing line graph
c. All areas average preliminary & existing line graph
d. Individual farm areas' preliminary and existing line graph
e. Ranking Tables

In this context, analyses have been conducted based on the values obtained from the plans. As a result of the analyses, the average values of the farms have been revealed, and the trends in the variations between two different preliminary and existing situations have emerged. These trends have been interpreted in line with qualitative variables. The relationships of these trends with dynamics, such as changing design trends, agricultural regulations, technological changes, and socio-economic structure,s will also be specifically discussed.

Syntactically, seven parameters have been emphasized, and these parameters have been classified according to their calculation methods. Special cases related to the parameter between all parameters and situations will be examined. The descriptions of these parameters and what they will generally output are explained in the following paragraphs.

Isovist area is a term used to describe the area seen from a specific point in a given environment and is often used to measure visual connectivity within a space. The concept was

first introduced in Michael Benedikt's 1979 book "To Take Hold of Space: Isovist and Isovist Fields". Benedikt defined isovist area as "the surface area visible from a given point in space". The parameters used for architectural scale analysis will prove particularly useful in analyzing variables such as identifying the points with the highest visibility for farms and determining whether they have partnerships with other farms.

Isovist perimeter refers to the boundary between visible and non-visible areas from a specific point within a given environment. It is a metric that measures the visual complexity of an observer's surroundings. Ruth Conroy Dalton expanded Benedikt's isovist analysis in her 2004 publication "The Secret is to Follow Your Nose: Route Path Selection and Angularity," defining isovist perimeter as "the contour that separates the visible and non-visible areas from a given vantage point." By examining the isovist area and perimeter together, we can establish a stronger relationship between view distance and visible area from the same points. That will enable us to conduct more consistent visual analysis at an architectural scale while maintaining accuracy and precision.

Occlusivity value is an isovist measure that indicates the extent to which the boundaries of synonyms overlap at a given point in space. That criterion defines the degree to which individuals interacting with the space are likely to perceive it. A space with a high occlusive value is one in which users' visual awareness is heightened; this means that, while the space is more integrated, it can also be distinguished from the overall plan and designated as a more specialized area. It would be beneficial to examine the specific situations in farms to identify more disconnected and closed areas in today's conditions, especially in newly emerging individual spaces.

Connectivity is a critical graph concept in space syntax analysis, focusing on how different spaces in a built environment are connected. It measures the spatial relationships between spaces and the ease with which these spaces are accessible to one another. Connectivity can be quantified using various metrics, such as depth, integration, and choice, and understanding the connectivity of different spaces is crucial for comprehending human behaviour and movement

patterns within a built environment. In urban analysis, high connectivity areas are typically associated with high levels of pedestrian activity and interaction, whereas low connectivity spaces are generally less used and less accessible to people [7]. Therefore, studying connectivity in farm space syntax can provide valuable insights for design and architecture, enabling the creation of more accessible, livable, and functional spaces. When considering personal visibility or occlusivity values, we expect that areas with high connectivity values may be unnoticed. Therefore, analyzing farm spaces from various perspectives through connectivity will be enabled.

Integration is a graph measure that measures how connected or accessible space is. It is defined as "the average depth of a space in the isovist field of all other spaces in the configuration"[7], which shows how many other spaces can be reached from a given space within a certain distance. High integration values mean the space is more accessible and better connected to other spaces in the built environment. Since the courtyard has the highest integration value in farms, analyzing the hierarchy of directly and indirectly connected areas after the courtyard on the general plan plane will be beneficial for us to understand.

Mean depth measures how deep space is located within the overall spatial configuration of the built environment. It is calculated as "the average shortest path distance from a space to all other spaces in the configuration" [7]. A low mean depth value indicates that a space is centrally located within the spatial configuration, while a high mean depth value suggests that the space is located on the periphery. We expect that mean depth and integration will yield comparable results but will be utilized to pinpoint the areas of greatest production, particularly in the deepest regions.

Radial data refers to the spatial attributes measured from a point outward in all directions. These attributes include connectivity or centrality. Radial mean, radial variance, and radial standard deviation are metrics used to describe the distribution of these attributes across space. Benedikt (1979) describes radial mean as the average value of a particular attribute at each distance from a given point [39]. According to Dalton (2004), radial variance measures the degree of variability in this attribute across different distances from the point of origin, while radial standard deviation provides a standardized measure [27]. Space Syntax analyses commonly use

these metrics to assess urban environments' spatial structure and organization. Radial data will be examined specifically to assess morphological and organizational changes quantitatively. Radial data will be examined specifically to evaluate morphological and organizational changes quantitatively. A graphical analysis will be conducted to test that the overall change will be in the same direction to understand pre- and post-situation in farms.

According to these definitions, the social, hierarchical, and spatial relationships among all farms and the direction of change between the preliminary and existing states can be understood through the graphics indicated.

4.4.Methodology Results

The methodology of this study was determined for the Cukurova farms, which had not been previously studied. Since there had been no previous study and data, long interviews had to be conducted with all farm owners to understand the spatial, functional, and social structures of all farms. That allowed the farm space to be defined as a whole. The study aimed to understand the transformation of farms between their existing and preliminary states. Therefore, it was deemed appropriate to examine the farms using the space syntax method to understand how they are currently and will change in the future. Agricultural production has been ongoing in Cukurova since the beginning of history, so the region has a wealth of spatial, social, and agricultural knowledge. To see how this knowledge is reflected in farm spaces and to understand the transformation, the quantitative analysis method of space syntax is important for understanding and designing farm spaces. Space syntax clearly understands farm spaces' hierarchy, usage status, and general organization. Consequently, the analyses and observations of all the farms were synthesized, leading to the formulation of master plan suggestions for Cukurova that align with the spatial relations of the farms.

CHAPTER V

ANALYSIS OF CASE FARMS

This section will discuss the analyses' analysis, interpretation, and results. Firstly, the conclusions, discussions, and results derived from field studies will be shared. Then, the syntax analysis data of the plans obtained during field studies will be evaluated. Syntax data is presented in tables . In addition to these tables, graphs showing the similarities, differences, and changes in the preliminary and existing situations of the farms are presented. These graphics enable the reading and discussing numerical values obtained through Syntax 2D analyses. Graphics are the basis for interpreting the transformation of farms in numerical terms based on examples and subsequent comments.

This section consists of five parts. These are field study analysis, isovist data, graph data, radial data, and individual and common spaces analysis. The section mentioned contains entirely qualitative evaluations. The remaining sections interpret quantitative results according to syntax parameters with qualitative results. Isovist, radial, and graph parameters will be analyzed independently, and only the main regions accepted in farms. Thus, only syntactic similarities and differences will be interpreted in pairs, excluding observable changes and similarities. The fifth section will evaluate social spaces observed in farms and representing an important change in conjunction with selected space syntax parameters and main areas. Finally, in the sixth subheading, the direction of farm transformation and the spatial relationships of farms will be discussed based on all the analyses conducted. As a result of the synthesis of these analyses, a farm master plan will be created with a focus on spatial relations.

5.1. Field Study Analysis

In this section, based on observations and questions&answers during fieldwork, farms' existing and preliminary situations will be interpreted and analyzed. The fieldwork consisted of three main stages. Firstly, the owners visited every part of the farms, and questions were asked about the spaces. Then, detailed photos of the farms were taken with a drone and a camera to create photogrammetric 3D models. Lastly, information about the farms and social was obtained using the questions in the table in the methodology section (Table 2). In this section, a general interpretation will be made especially based on the questions (Table 4), as the farms are individually described under the title of Cukurova.

First of all, except for Kubilay Farm, all farms have a history of at least 70 years. Therefore, the regions where they were built show significant common characteristics. All farms were built parallel to the irrigation channels the State Hydraulic Works (DSİ) made. These channels, used as drinking and irrigation water in the past, are now only used for irrigation. In addition, whether there is a common situation among the entrances of the farms and the orientation of the buildings has been examined. However, there is no common situation because five farms are oriented to the north, 4 to the south, 3 to the west, and 3 to the east.

Secondly, various interpretations were made based on the questions under the heading of 'spaces and their usage on farms. First of all, three different spaces serving different purposes were encountered. These are shown in the table below (). Some of them have been present since the beginning, while some are spaces that have been added, transformed or disappeared for various reasons, and their table is also shown in the table below. The new spaces in the table, the fertilizer and agricultural pesticide storage, have been created due to good agricultural practices (İyi Tarım Uygulaması) in Turkey and because they are high-value economic assets that must be stored in more secure areas. The agricultural equipment park results from technology and the transition from field to orchard farming. In orchard farming, the main equipment includes tractors, spraying machines, fertilizing machines, back-levelling machines, rotavators (hoeing machines), various sizes of trailers, and fertilizer mixing machines. Additional equipment can also vary

depending on the land's size and the farmer's economic situation. In contrast, only a tractor, hoeing machine, seed planting machine, and sandblasting machine were sufficient equipment 40 years ago.

The irrigation centre is mainly found on farms with drip irrigation system technology. It may not be located within some farms' courtyards, but in some cases, it can be located within the land. It is a space that occupies an average of 30-40 m^2 and includes various water filtration systems, electrical panels, and filling areas for the pesticide machine depot. If the water is taken from the canal, an additional water pump may be included, and this space can be enlarged. Moreover, the fertilizer mixing machine given with drip irrigation is generally portable, but if the farmer's land is a single piece, a fixed system can be used, doubling the irrigation centre area.

The greenhouse is a space that is present in most large-scale farmers. Its main purpose is not for agricultural production but for personal needs such as fruit and vegetable production and for producing fruit seedlings to be planted on the land.

The parking lot is one of the new spaces used as a shelter for personal and guest vehicles from the heat of Cukurova.

On the other hand, there are new and diverse social spaces on farms. Unlike the lodgement, one is the dormitory, which provides temporary accommodation with multiple beds and a shared bathroom and toilet. We can describe the common sitting office area (CSOA) as a basic office space. Depending on the weather, this space is usually used for paperwork, job interviews, shopping, and as an alternative to the open communal sitting area. It typically includes a small kitchen where refreshments such as tea and coffee can be served. In today's agricultural production, paperwork has increased, and salaries for farm workers and buying and selling transactions are generally done in cash, so there is a need for a secure place where the cash box is kept. We can say that the individual open sitting area (IOSA) and individual close sitting area (ICSA) directly result from cultural changes in rural areas. According to all farmers over sixty, workers and employers used to eat at the same table and work together in the fields, and the courtyard kitchen was the only social sitting area. However, as privacy has become more

privatized, socio-economic differences have directly affected the social sitting areas' orientations on farms.

We discussed the emerging spaces in the above two paragraphs. As seen in table 5 below, some spaces have disappeared due to changes in technology and agricultural production. One of the main missing spaces is the courtyard kitchen because it was a complex space where all farm users spent their days together, and now it either does not exist, or we can only see traces of it in most farms. This space can be considered a complex space with a stone oven, a stone fireplace, a large pantry, and open and closed seating areas. However, we no longer observe these spaces because employees eat in their lodgement and bosses eat in their farmhouse. The only reason is not social, but indirectly, we no longer need these spaces due to the technology that has brought ovens, stoves, and plumbing to our homes.

The grain barns have now turned into large storage areas. Farmers who grow field crops can now deliver directly to buyers instead of storing them, so these spaces have lost their function. Due to modern wells and plumbing systems, shared bathrooms, wells, and cisterns can only be observed their traces of ruins. Finally, the horse stable has become large cattle sheds or storage areas. There are a few farmers who only keep horses as a hobby.

In the final part of this section, user data for farms will be discussed. On average, there are two farm workers, excluding the farm owner. As stated by farm owners, at least one worker is needed for every 100 decares of land. These workers usually accommodate in lodgement with their families. However, there is a decreasing need for farm workers; a full-time worker is unnecessary for most farmers. Therefore, the lodgement on farms has either been demolished or repurposed. Even full-time workers on many farms travel to and from nearby settlements. Specifically about Cukurova, every farm is within a 10-minute drive from the closest settlement and no more than half an hour from city centres. The impact of transportation networks can directly affect farms when discussing farm design nowadays; because of their economic situations, most of the families of workers who reside on farms do not have cars, making it difficult for them to access many public services such as schools and hospitals.

For this reason, most farmers arrange transportation for their workers or take on this responsibility themselves. Due to these factors, the number of workers living on farms is very low according to preliminary situations. As a result, the number of male immigrants who have come to Turkey in recent years has been increasing without their families in lodgings on farms. In general, if farm owners do not provide their workers comfortable lodgement and create sharp hierarchical situations, the working conditions will likely become more difficult as time passes. Therefore, it is necessary to establish a healthier relationship between lodgings, courtyards, and farmhouses and provide transportation options for workers.

In summary, the common situations of farms were discussed based on the questions in table 2 in the methodology section. Most farm design problems that cannot be obtained through syntactic analysis could be identified through these questions.

Table 4: Observed Farm Spaces' Categories

Agricultural Spaces	Social Spaces	Special/ Not Common Spaces
Courtyard Center	Farm House	Agricultural Equipment Repair Workshop
Main Storage	Lodgement	Car Repair Workshop
Pesticide Storage	Dormitory	Wood Workshop
Fertilizer Storage	Courtyard Kitchen	Cold Storage
Open Storage	Common Open Sitting Area	Packing Area
Agricultural Equipment Park	Common Sitting Close Area / Office	Barn
Irrigation Center	Individual Open Sitting Area	Coop
Workshop	Individual Close Sitting Area	Dog Room
Greenhouse	Office	
Porch		
Car Park		

Table 5: Observed Farm Spaces' Condition

Ongoing Spaces	New Social Spaces	New Agricultural Spaces	Non-existent Spaces
Courtyard	Dormitory	Pesticide Storage	Courtyard Kitchen
Main Storage	Common Sitting Close Area / Office	Fertilizer Storage	Granary
Porch	Individual Open Sitting Area	Agricultural Equipment Park	Cistern or Well
Workshop	Individual Close Sitting Area	Irrigation Center	Common Bath
Lodgement		Greenhouse	
Common Open Sitting Area		Car Park	
Barn and Coop			
Open Storage			

Table 6: Basic Characteristics of Farms in the Field Study Area

Case	Exiting Walkable Area	Preliminary Walkable Area	Year	Courtyard Type
Utanç Çiftliği	3739 m²		1830s	Courner Courtyard
Sapandere Çiftliği	4196 m²	2673 m²	1850s	Central Couryard
Mustafa Fırat Çiftliği	4444 m²	1284 m²	1952	Seperated Courtyard
Özgiray Çiftliği	2810 m²	2662 m²	1930	Central Couryard
Yolaçan Çiftliği	3548 m²	3578 m²	1930	Central Couryard
Çaylaklar Çiftliği	2334 m²		1930	Courner Courtyard
Gürani Çiftliği	2143 m²	2088 m²	1930	Central Couryard
Sarıköşk	3763 m²		1930	Central Housing
Eski Teke Çiftliği	915 m²	918 m²	1930	Courner Courtyard
Batakçı Kerim Çiftliği	2764 m²	2779 m²	1938	Central Couryard
Kozacılar Çiftliği	1857 m²	1752 m²	1955	Central Couryard
Karmutoğlulları Çiftliği	3700 m²		1930s	Central Couryard
Ovadan Çiftliği	4805 m²	2353 m²	1850s	Central Couryard
Huzurkent Tarihi Çiftlik	1623 m²		1850s	Central Couryard
Kubilay Çiftliği	6243 m²		2014	Seperated Courtyard

5.2. Isovist Data Analysis

This section will examine the selected isovist parameters for the preliminary and existing farm plans. These parameters are isovist area, isovist perimeter, and occlusivity. The relationship between the isovist area and perimeter and the most visible areas of the farms will be discussed. There is an expected parallelism between these two parameters. If some locations or farms do not show parallelism, their discussion will be done separately. Thanks to the perimeter parameter, it is possible to differentiate the length and width dimensions of spaces with the same isovist area value by looking at the perimeter value of the spaces. Finally, occlusivity is a parameter to identify areas within enclosed farms with less access and visibility from other points. Especially when comparing preliminary and existing situations, it will be discussed why farms increase or decrease in functional or social occlusivity values.

As a result, the obtained values in the above table (Table 7 & Table 8) will be visualized with various histograms and graphs to make them more easily readable. Thus, the isovist values and relationships between farms can be analyzed. The visibility status of farms in Cukurova will also be discussed by graphs created from the averages of the farms' isovist values, indicating why and how they have been changed.

Table 7: All Existing Isovist Data's Values

CASE		Isovist Area	Isovist Area	Isovist Area	Isovist Area	Isovist Area	Isovist Area
EXISTING		Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği		13983570	21151041.5	14561624.50	749167.91	17343211.78	3352489.65
Sapandere Çiftliği		11772275	19444508.4	15515924.84	820568.66	15460047.25	1149408.08
Mustafa Fırat Çiftliği		6043857	13880219.9	13622078.19	4554728.36	7922147.83	5008474.68
Özgiray Çiftliği		14568747	20935771.5	16883907.70	633906.36	19634281.50	958132.80
Yolaçan Çiftliği		7788915	13134192.0	11921490.48	2893271.21	6718009.65	5175165.08
Çaylaklar Çiftliği		8932836	14565025.8		3751731.78	8138701.79	9535657.93
Gürani Çiftliği		5680850	8685584.0	6589069.95	1754037.26	10719422.07	1573764.68
Sarıköşk		14371536	21801804.3	9941405.77	1104553.33	13960024.40	3603067.42
Eski Teke Çiftliği		3262011	5758085.0	4392885.14	390861.39	2688817.63	3459171.25
Batakçı Kerim Çiftliği		7341050	14334574.0	13367178.36	982339.88	10868913.92	6376310.45
Kozacılar Çiftliği		6971778	11496795.9		1958651.09	10723522.35	1315975.97
Karmutoğlulları Çiftliği		13587524	22294834.0		3247476.69	17930824.07	6001335.25
Ovadan Çiftliği		8208473	18241308.9	10355624.90	3608083.53	12355670.67	2641416.47
Huzurkent Tarihi Çiftlik		6037176	9893256.7		1099577.55	6424305.92	5974784.24
Kubilay Çiftliği		14292724	22095993.1	13622564.35	336362.35	12396281.65	7883064.61
	COUNT	15	15	11	15	15	15
	AVERAGE	9522888.09	15847533.00	11888523.11	1859021.16	11552278.83	4267214.57
	STADART DEVIATION	3852317.295	5420788.44	3792978.213	1391977.859	4757477.022	2588230.911
CASE		Isovist Perimeter	Isovist Perim	Isovist Perim	Isovist Perim	Isovist Perim	Isovist Perimet
EXISTING		Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği		81646	113537.5	47951.76	5096.63	55263.39	38724.00
Sapandere Çiftliği		34225	55895.7	39204.82	7170.13	40814.00	7696.09
Mustafa Fırat Çiftliği		38046	64915.8	76012.86	27847.25	31828.52	21633.68
Özgiray Çiftliği		47007	66740.7	49934.47	5027.91	39545.57	6587.16
Yolaçan Çiftliği		63294	67988.3	73552.55	13699.22	83287.28	19727.31
Çaylaklar Çiftliği		31450	45175.8		12485.51	50004.93	24495.91
Gürani Çiftliği		23507	32019.6	27564.81	9002.74	37364.36	10822.75
Sarıköşk		45891	59019.0	43182.57	11680.12	63326.76	31561.30
Eski Teke Çiftliği		32552	50476.5	44810.24	4715.10	20456.54	15667.87
Batakçı Kerim Çiftliği		32361	52178.22	49166.99	6390.06	57529.43	26416.56
Kozacılar Çiftliği		24887	37524.7		24726.32	27022.96	8278.71
Karmutoğlulları Çiftliği		55428	77705.3		16135.47	63185.67	26019.40
Ovadan Çiftliği		36317	65994.3	41351.19	25333.03	45421.39	23931.97
Huzurkent Tarihi Çiftlik		27248	41939.6		14065.26	24992.12	32913.70
Kubilay Çiftliği		56834	85340.3	56757.48	3165.73	31420.23	26823.64
		15	15	11	15	15	15
		42046.16	61096.76	49953.61	12436.03	44764.21	21420.00
		16300.96987	20661.97669	14317.85957	8034.606088	17338.16335	9837.328494
CASE		Occlusivity	Occlusivity	Occlusivity	Occlusivity	Occlusivity	Occlusivity
EXISTING		Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği		0.12	0.10	0.10	0.47	0.13	0.07
Sapandere Çiftliği		0.26	0.18	0.17	0.35	0.19	0.48
Mustafa Fırat Çiftliği		0.20	0.22	0.14	0.17	0.22	0.23
Özgiray Çiftliği		0.25	0.21	0.16	0.42	0.30	0.41
Yolaçan Çiftliği		0.18	0.15	0.13	0.28	0.08	0.22
Çaylaklar Çiftliği		0.27	0.27		0.18	0.15	0.34
Gürani Çiftliği		0.28	0.27	0.23	0.23	0.21	0.33
Sarıköşk		0.19	0.19	0.14	0.18	0.15	0.14
Eski Teke Çiftliği		0.19	0.13	0.15	0.36	0.22	0.23
Batakçı Kerim Çiftliği		0.29	0.24	0.26	0.59	0.20	0.16
Kozacılar Çiftliği		0.29	0.29		0.07	0.26	0.33
Karmutoğlulları Çiftliği		0.16	0.14		0.15	0.15	0.31
Ovadan Çiftliği		0.22	0.22	0.17	0.23	0.26	0.14
Huzurkent Tarihi Çiftlik		0.28	0.29		0.18	0.20	0.21
Kubilay Çiftliği		0.17	0.09	0.12	0.71	0.22	0.34
		15	15	11	15	15	15
		0.22	0.20	0.16	0.31	0.20	0.26
		0.054453674	0.065865975	0.047443126	0.180022549	0.056711824	0.113634769

Table 8: All Preliminary Isovist Data's Values

CASE		Isovist Area	Isovist Area	Isovist Area	Isovist Area	Isovist Area	Isovist Area
PRELIMINARY		Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği							
Sapandere Çiftliği		9798115.23	16924659.12	13243401.02	705413.22	2530267.77	2018733.30
Mustafa Fırat Çiftliği		3916575.27	7095234.71	5305181.83	336441.62	4748626.87	996475.31
Özgiray Çiftliği		13409429.71	18990964.43	16774603.57	417620.05	18694478.48	922700.46
Yolaçan Çiftliği		12334453.30	20702627.42	17347972.88	5076219.77	20404128.09	1490964.95
Çaylaklar Çiftliği							
Gürani Çiftliği		9938261.69	12714521.27	10357184.82	2390777.92	11824815.20	1683117.36
Sarıköşk							
Eski Teke Çiftliği		5692747.82	6938201.31	3372437.61	195456.40	4313549.66	390861.39
Batakçı Kerim Çiftliği		8382247.19	15491927.80	14683266.51	857943.39	14306772.07	6537366.41
Kozacılar Çiftliği		5704413.41	9785835.26	9119380.10	3231233.96	8902887.70	2182658.12
Karmutoğulları Çiftliği							
Ovadan Çiftliği		8471704.27	13539058.62	9890504.96	2555395.67	9848693.83	4805829.96
Huzurkent Tarihi Çiftlik							
Kubilay Çiftliği							
	COUNT	9.00	9.00	9.00	9.00	9.00	9.00
	AVERAGE	8627549.77	13575892.22	11121548.14	1751833.56	10619357.74	2336523.03
	STADART DEVIATION						
CASE		Isovist Perimeter	Isovist Perim	Isovist Perim	Isovist Perim	Isovist Perim	Isovist Perimet
PRELIMINARY		Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği							
Sapandere Çiftliği		71492.67	96150.32	58747.98	6243.74	12567.02	31340.60
Mustafa Fırat Çiftliği		18844.25	27667.73	21778.72	4116.26	24402.92	11918.25
Özgiray Çiftliği		30264.37	38811.76	56893.59	3887.16	35836.44	6392.96
Yolaçan Çiftliği		59652.60	87256.62	88885.86	27179.26	81782.49	7566.07
Çaylaklar Çiftliği							
Gürani Çiftliği		33319.74	44931.03	49900.17	21895.43	60977.09	10405.74
Sarıköşk							
Eski Teke Çiftliği		20881.06	23632.39	16552.86	3777.36	22462.18	4715.10
Batakçı Kerim Çiftliği		46086.28	71178.22	73131.44	5787.31	97242.05	36160.02
Kozacılar Çiftliği		25298.65	35176.22	29961.41	37278.82	56594.09	12614.37
Karmutoğulları Çiftliği							
Ovadan Çiftliği		34219.19	55599.92	29881.64	14403.32	46626.69	24799.00
Huzurkent Tarihi Çiftlik							
Kubilay Çiftliği							
		9.00	9.00	9.00	9.00	9.00	9.00
		37784.31	53378.25	47303.74	13840.96	48721.22	16212.46
CASE		Occlusivity	Occlusivity	Occlusivity	Occlusivity	Occlusivity	Occlusivity
PRELIMINARY		Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği							
Sapandere Çiftliği		0.17	0.14	0.11		0.26	0.11
Mustafa Fırat Çiftliği		0.22	0.21	0.24	0.39	0.15	0.18
Özgiray Çiftliği		0.35	0.33	0.21	0.48	0.34	0.37
Yolaçan Çiftliği		0.20	0.15	0.12	0.20	0.15	0.13
Çaylaklar Çiftliği							
Gürani Çiftliği		0.22	0.15	0.17	0.17	0.11	0.30
Sarıköşk							
Eski Teke Çiftliği		0.26	0.22	0.18	0.48	0.27	0.25
Batakçı Kerim Çiftliği		0.25	0.20	0.18	0.39	0.13	0.18
Kozacılar Çiftliği		0.31	0.31	0.22	0.08	0.14	0.28
Karmutoğulları Çiftliği							
Ovadan Çiftliği		0.27	0.25	0.25	0.22	0.24	0.26
Huzurkent Tarihi Çiftlik							
Kubilay Çiftliği							
		9.00	9.00	9.00	8.00	9.00	9.00
		0.25	0.22	0.19	0.30	0.20	0.23

5.2.1. Isovist Area

The relationship between the visibility status of spaces in farms can be discussed with the isovist area parameter. As a result of observations, we can come to a superficial conclusion about the isovist area of spaces. However, to achieve a detailed result and compare the farms within themselves and their preliminary-existing situations, the isovist area values will enable us to analyze the farms more analytically and systematically.

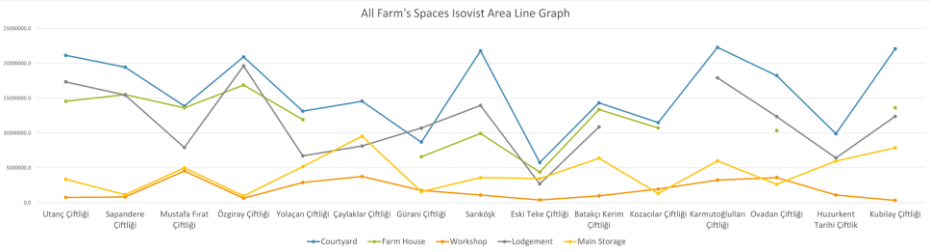


Figure 133: All Farm's Spaces Isovist Area Line Graph

The line graph (Figure 133) above shows the existing conditions of all farms within the scope of the study and the isovist area values of all their spaces. It has been revealed that there is a common correlation between the visibility of spaces in farms with this graph. Generally, sorting from the most visible to the least visible is ranked as courtyard > farmhouse≥ lodgement > main storage > workshop. Except for farmhouses and lodgements, there is a clear ranking among the farms. The distinction between these lodgings and farmhouses will be discussed for each farm individually through isovist area graphics in the following section. Understandably, a farmhouse has a higher value since it is important for the farm owner to have visual control over the entire farm. On the other hand, it is understandable that in farms where the lodgement isovist area value is high, and the farm owners do not reside permanently, the workers who live in lodgement have a visually dominant position over the farm.

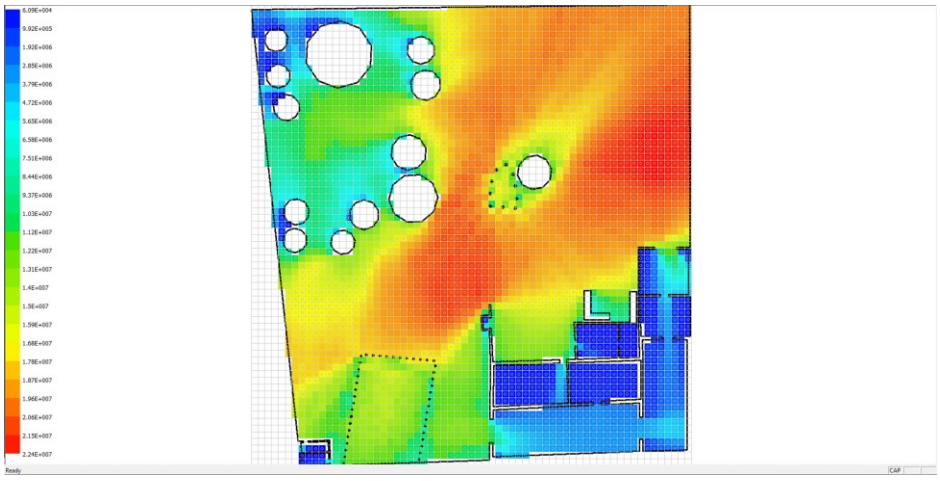


Figure 134: Utanc Farm, Isovist Area Graph

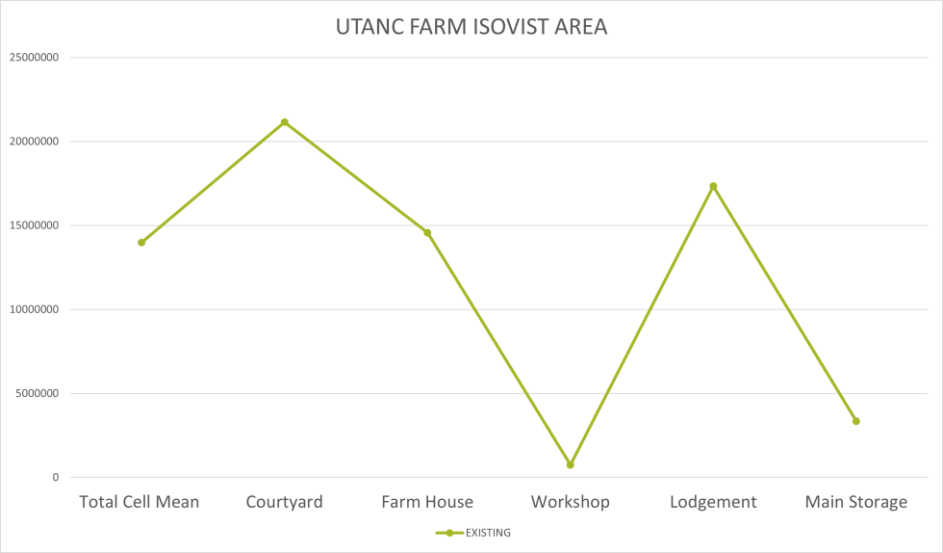


Figure 135: Utanc Farm, Isovist Area Values Line Graph

Within the Utanç Farm, the hierarchy of isovist area values for the locations is listed as follows: Courtyard > Lodgement > Farm House > Main Storage > Workshop. The courtyard's centre has two distinct and highly visible areas: a semi-functional well and a tree. Therefore, the elements located in the courtyard center of the farm make it difficult to have visual control from a human perspective. As this situation made it difficult to control the entrances and exits of the farm, the farm owner had to add a motion sensor device to the main gate that produced a loud alarm sound every time someone entered. Such a situation is not present in other farms, so we can conclude that entry to the farm and visual dominance over the entire courtyard is important. Additionally, the farm owner does not have a comfortable house suitable for permanent accommodation, and the lodgement has higher isovist area values.

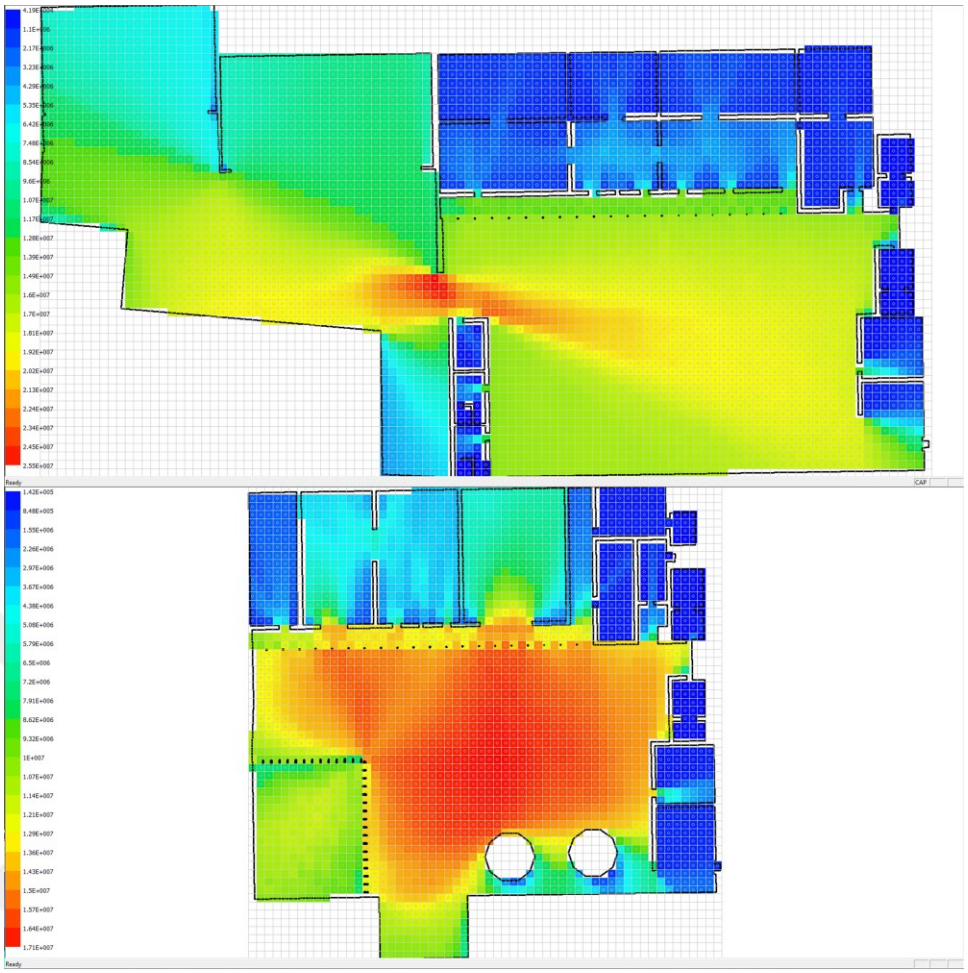


Figure 136: Sapandere Farm, Preliminary and Existing Isovist Area Graph

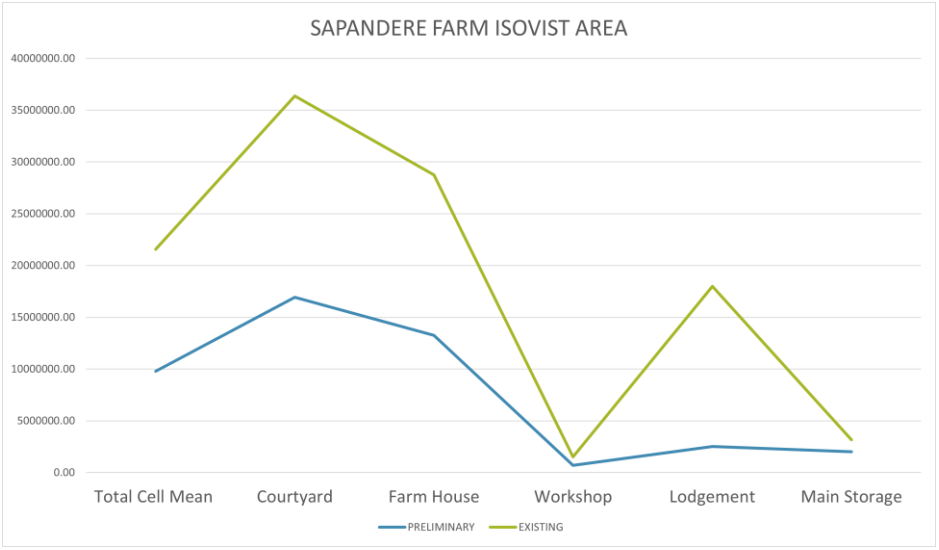


Figure 137: Sapandere Farm, Isovist Area Values Line Graph

The visibility ranking of Sapandere Farm is as follows: Courtyard > Farmhouse > Lodging > Main Storage > Workshop. The preliminary ranking is Courtyard > Lodging > Farmhouse > Main Storage > Workshop. From this, we understand that in the previous situation, farm workers were more active in residing on the farm, so they had better visual control over it. As the farmhouse is on the first floor, the visual control from the house is higher, and there is a big difference between what the farm owner can see from their house and what they can see from the main gate. Currently, we can say that the higher isovist area value at the entrance of the farmhouse is due to the permanent residence of the farmer who owns the farm. Due to the more collective life in social relations on farms in the past, like a small village, we can say that the values of protection and privacy were not as sharp as they are today between the owner and the worker. Today, the decline in the visual control of farm workers can be explained by this situation. Because the farm owner may prioritize their privacy and protection as they both permanently reside and live on the farm, the farmhouse entrance may have a higher isovist value today.

Another factor is that the graph position of the farmhouse increases due to the additional area built on the farm. If this additional area had been built towards the side of the staff quarters, rather than the area dominated by the farmhouse, the graph position of the staff quarters would have increased much more. Additional space could have been added to the area where the lodgement units visually dominate, but this extra space was deliberately added to the area where the farmhouse visually dominates. Therefore, prioritizing visual dominance from the farmhouse in the additions made to farms today helps to understand the difference between old and new social life. At the same time, places that used to be lodgings are now being used for different purposes, and the lodgings are built across from the farmhouse, which visually dominates the area. Today, the hierarchy read through the isovist area at Sapandere Farm is much clearer.

Generally, the isovist area values in Sapandere farm are higher today. Thus, most parts of the farm are visually more easily under control. Although it seems that the primary reason for this increase is the additional construction, the changing locations of the spaces also aim to increase

visual dominance. In other words, the relationship between farms and spaces is becoming stronger nowadays.

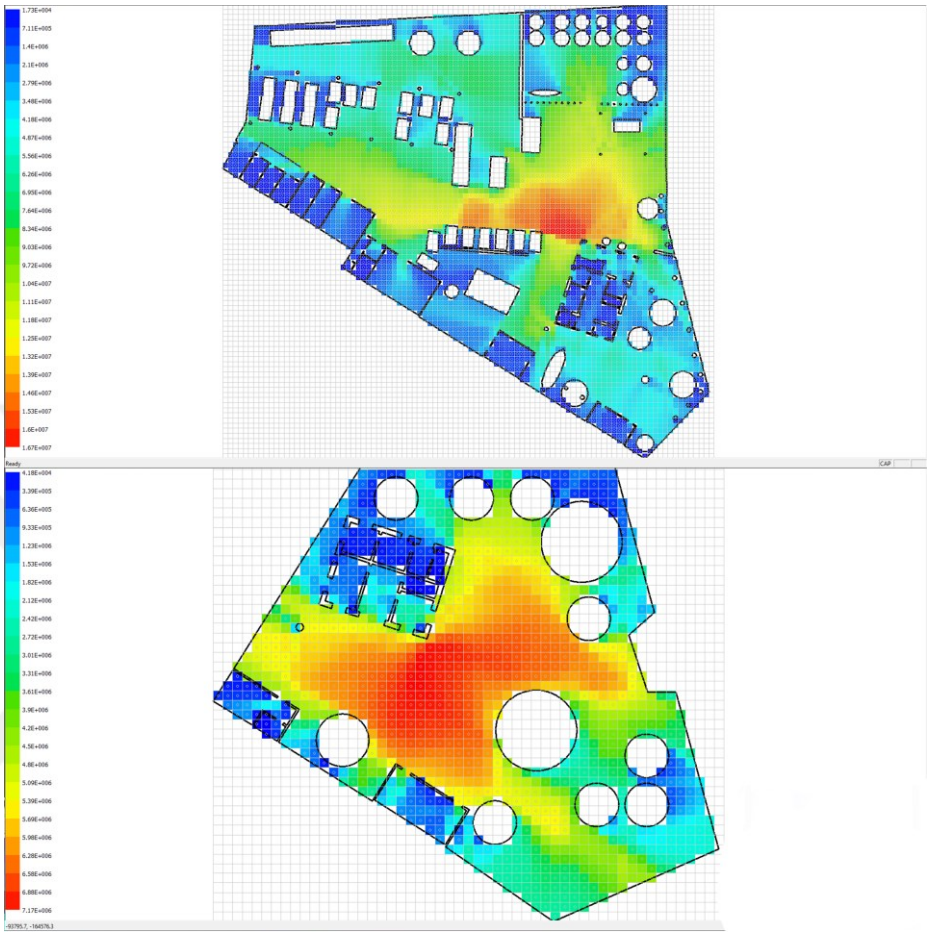


Figure 138: MGF Farm, Preliminary and Existing Isovist Area Graph

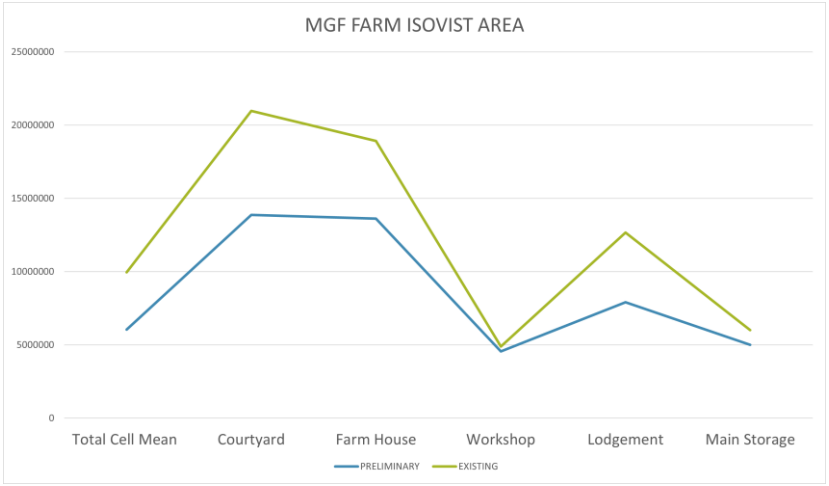


Figure 139: MGF Farm, Isovist Area Values Line Graph

The existing and preliminary visibility rankings of Mustafa Gazi Fırat (MGF) farm are as follows; Courtyard > Farmhouse > Lodgement > Main Storage > Workshop. From this, we can understand that the spatial hierarchy has remained the same internally in the previous and current situations. Both preliminary and existing farm owners reside in the farmhouse. Therefore, we can assume that the lack of a critical change in the isovist area ranking is due to this situation. When higher values are obtained in the preliminary and existing situations, it is due to the expansion of the farm area and additional structures. Therefore, the farm's unchanged operational and accommodation conditions have also ensured that the isovist area rankings remain unchanged in the main areas.

As seen in the isovist area graphics (Figure 139), the farm has grown by being attached towards the north and west directions, and the courtyard's entrance has changed. Currently, the most visible courtyard in the preliminary state has turned into a backyard of the farmhouse with the lowest isovist area values, forming a landscape area. From here, we can understand that the farm can grow due to agricultural and social needs such as creating personal spaces. Currently, the backyard farm has become the least visible area, meaning it has transformed into a highly private and confidential space that differs greatly from the front yard area where agricultural activities continue.

Additionally, the new lodgements of the farm, which is situated in a two-courtyard system, are located in the western courtyard of the farm. Despite this location change, the visibility values of the lodgement and the farmhouse are listed in the same order, preliminary and existing change. Therefore, the factor that affects the status of the lodgement and the farmhouse in the farms is that the farm owner resides in them.

Additionally, farm area has increased almost four times, and workshop and main storage values have increased very little. That is because stored and used items are more expensive nowadays, so it is only a space with direct entry permission for users. Therefore, someone who enters the farm cannot directly see the locations of the workshop and storage areas.

Overall, isovist area values are higher in MGF farms today. The primary reason for this increase is the additional areas built, but the same spatial hierarchy still exists on the farm. Therefore, the unchanged usage in the MGF farm did not alter the spatial visibility ranking. Additionally, the fact that only orchard plants are cultivated on the MGF farm did not force any change in agricultural needs on the farm.

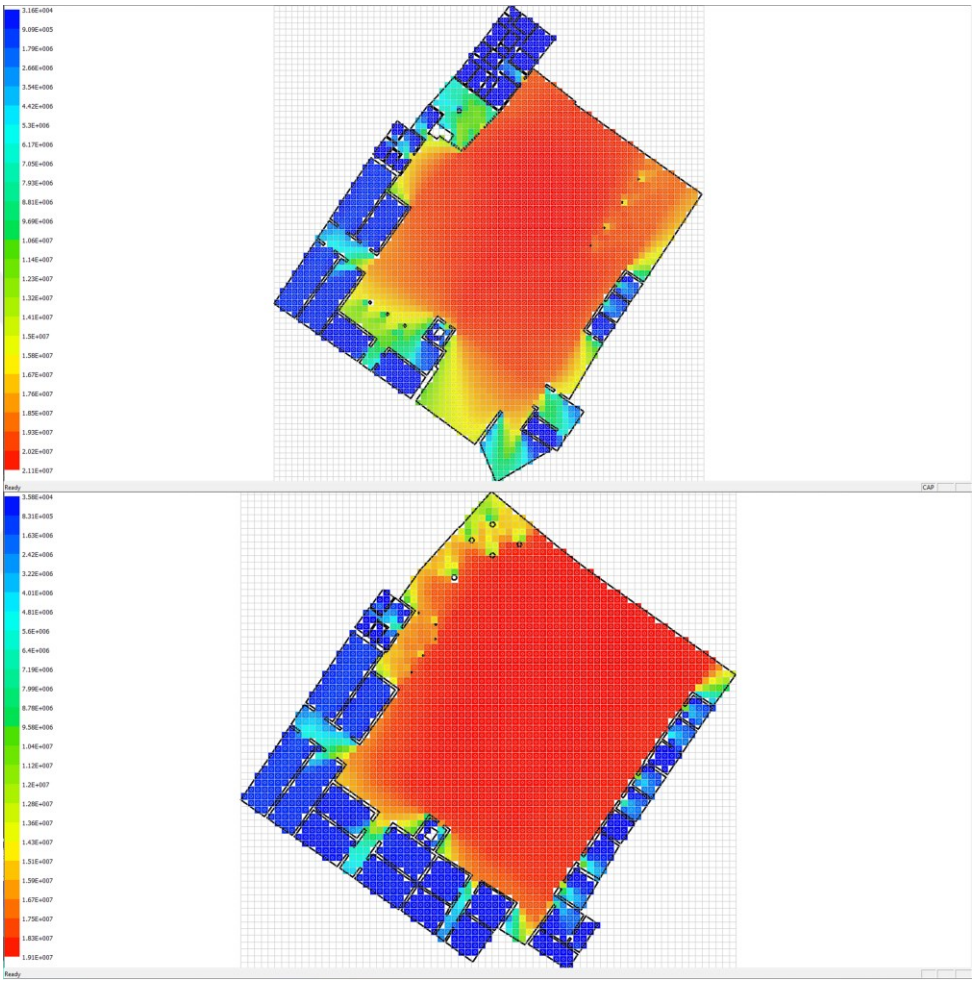


Figure 140: Ozgiray Farm, Preliminary and Existing Isovist Area Graph

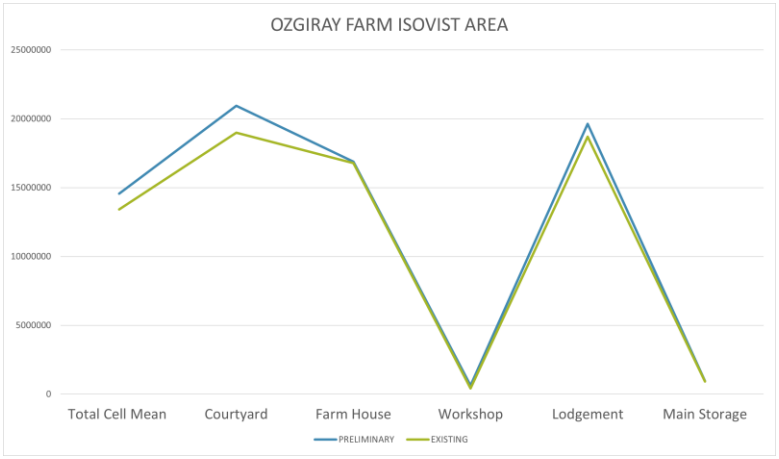


Figure 141: Ozgiray Farm, Isovist Area Values Line Graph

The existing and preliminary visibility rankings of Ozgiray Farm are as follows: Courtyard > Farmhouse > Lodgement > Main Storage > Workshop. We can understand from this that the spatial hierarchy has remained the same in the previous and current situations. In addition, as seen in the line graph above (Figure 141), the farm has almost no critical change except for the lodging part. However, the current values are higher than before. The primary reason is that the new lodging building, as seen in the isovist area graph above, has taken up a large area, causing all values to decrease in the graph.

In both the current and previous situations, the farm owners do not permanently reside, so the visual dominance of the lodgings is higher. Such old farms' collective and crowded living in the preliminary situation does not require all visual dominance in the farm owner.

Overall, there has been no critical isovist area change in this farm. This situation parallels the unchanged operational and vital functions of the farm.

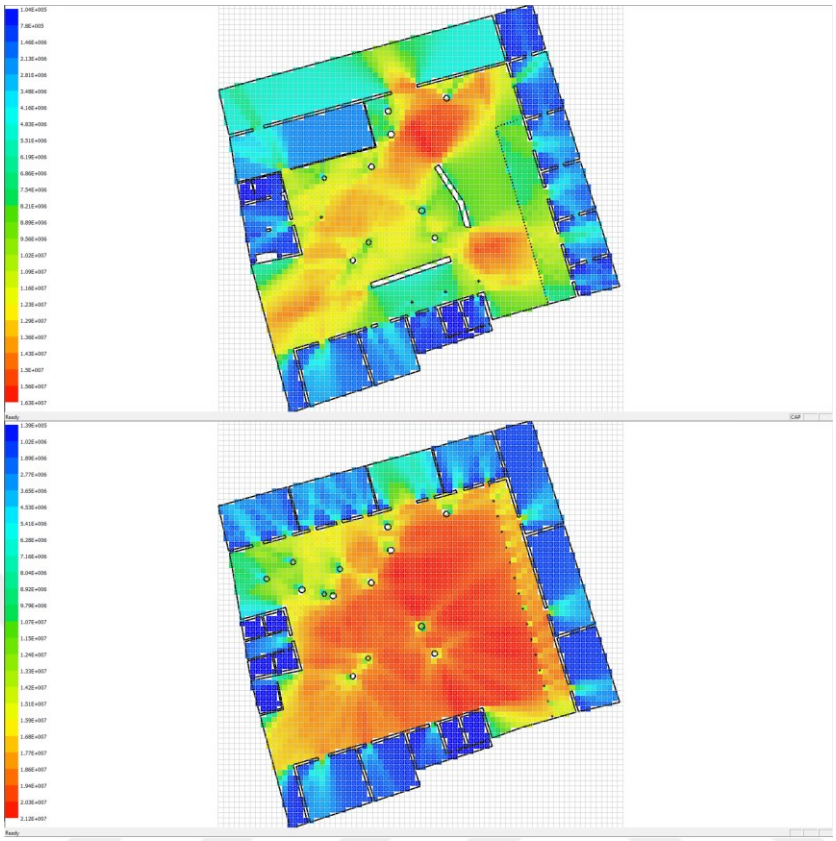


Figure 142: Yolacan Farm, Preliminary and Existing Isovist Area Graph

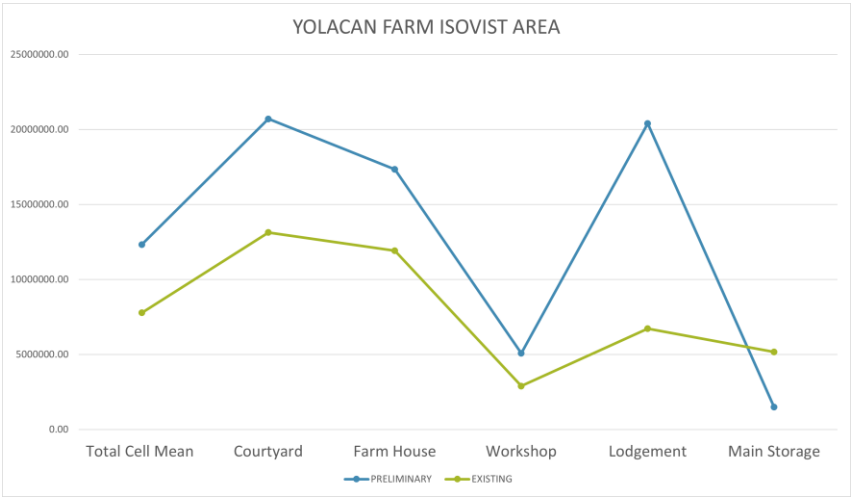


Figure 143: Yolacan Farm, Isovist Area Values Line Graph

Yolacan Farm's existing visibility ranking is Courtyard > Farmhouse > Lodgement > Main Storage > Workshop. Courtyard > Farmhouse > Lodgement > Workshop > Main Storage is the preliminary state. Yolacan Farm serves less agricultural land compared to other farms. Therefore, various landscape elements have been added to the courtyard, directly affecting isovist

area values from many places. The significant decrease in the Lodgement area is because it has been transformed into a maid house of a villa instead of a Lodgement. The syntactic change in the farm was due to landscape elements, not structural changes.

As seen in the isovist area graph above (Figure 143), the entrance of the farm and the storage area have the highest isovist area values. Still, visual dominance over all farm areas from the entire courtyard exists. The reason for the high visibility of the storage area is that this area serves as both a parking lot for personal vehicles and a storage area for agricultural materials. Therefore, this situation arises as it serves both agriculture and the farm owner.

Overall, agriculture has taken a back seat on this farm in today's world. Thus, with both the privacy requirements of modern life and the decrease in the farm's agricultural activities, isovist area values have seriously decreased on this farm.

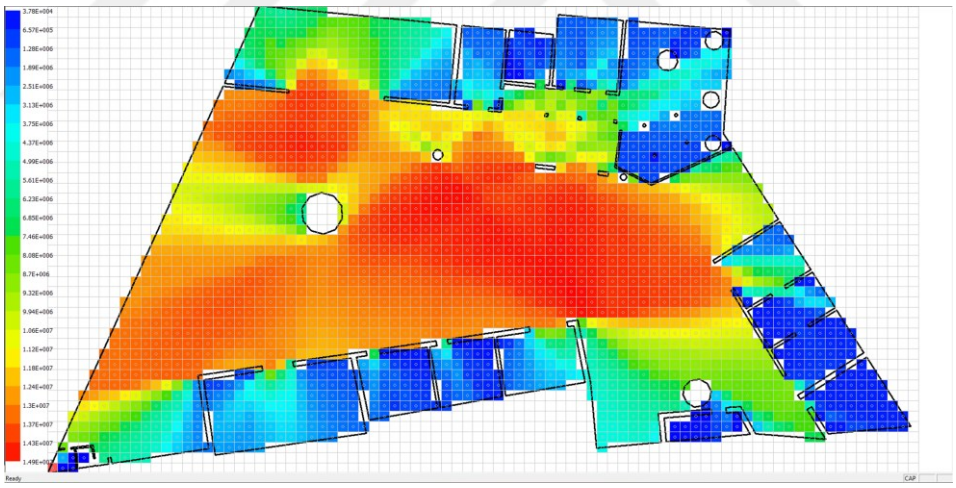


Figure 144: Caylaklar Farm, Existing Isovist Area Graph

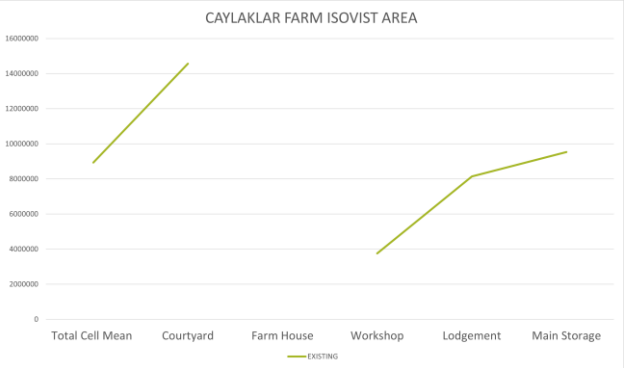


Figure 145: Caylaklar Farm, Isovist Area Values Line Graph

At Çaylaklar Farm, the visibility order of the spaces is as follows: Courtyard > Main Storage > Lodgement > Workshop. The main reason is the lack of a farmhouse and family living in the lodge. As a result, the farm has lost its function as a living space to a large extent and has turned into a factory-like space, with the courtyard and storage area becoming the most visible spaces.

Thus, in the isovist graph (Figure 144), there is a closed and less visible area in the top-right corner. This is the only social space with low visibility on the farm, which is a private activity area for the farm owner and is not related to the main functions of the farm. This area has been separated only through landscape elements, not structural changes.

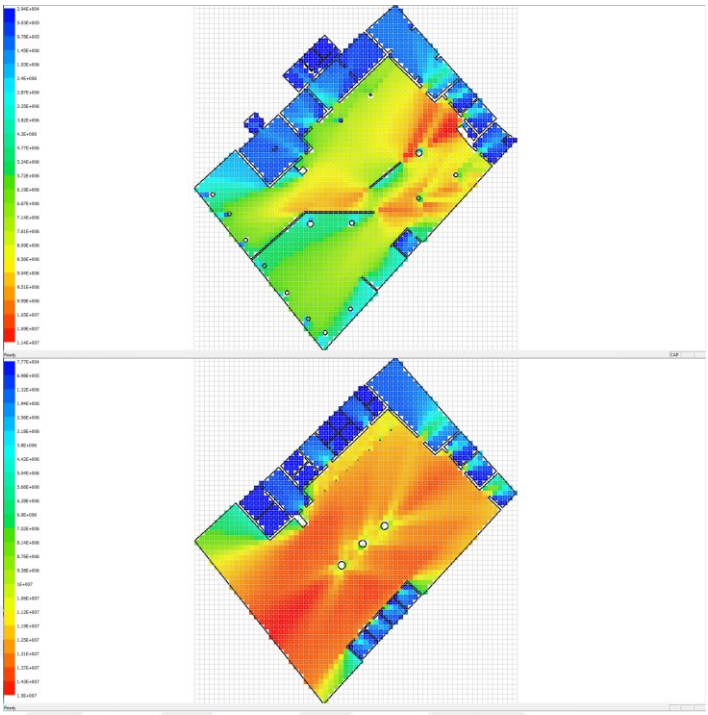


Figure 146: Gurani Farm, Preliminary and Existing Isovist Area Graph

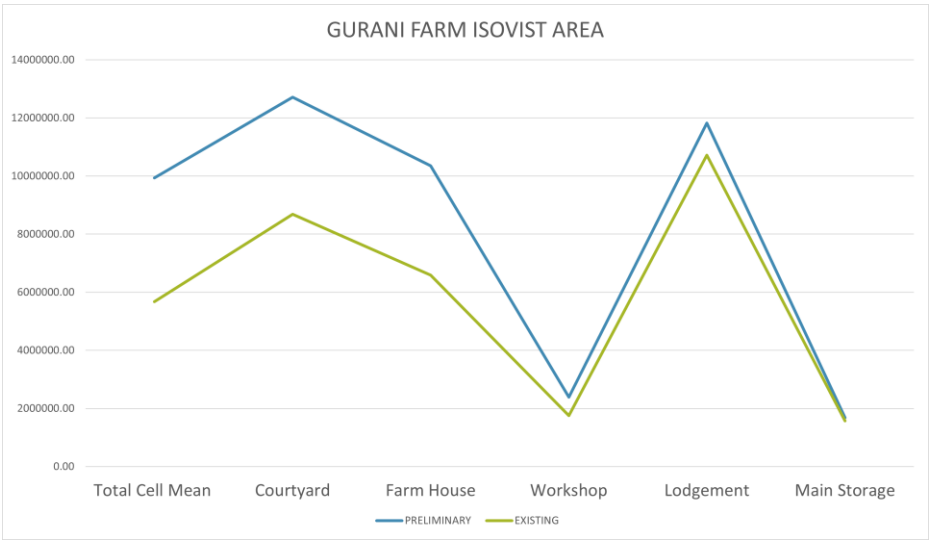


Figure 147: Gurani Farm, Isovist Area Values Line Graph

The preliminary and existing isovist area rankings of Gurani Farm are as follows; Courtyard > Lodgement > Farmhouse > Main Storage > Workshop. Storage and workshop areas have remained in the background as in other farms, but the highest variable in this farm is that the courtyard does not serve agricultural activities. That is because the courtyard continues to be a

collective living space, where two employees and their families, except for the farm owner, reside and use the courtyard as a living area. The only difference from the preliminary situation is that the courtyard now only serves as a living area, whereas it used to be an agricultural area. Therefore, all isovist area values have decreased compared to the previous situation due to the courtyard, which contains various social functions.

In general, as seen in the pre-post figure above (Figure 147), while there were only trees for shading in the courtyard's centre, there are now a pool, a BBQ area, and various seating areas. These later-made social areas have reduced the average isovist graph degree of the courtyard and the entire farm.

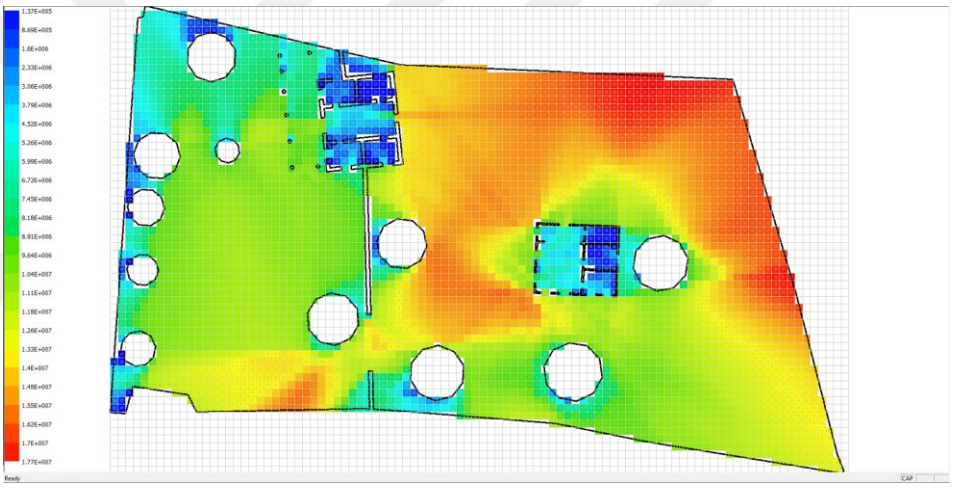


Figure 148: Sarikosk Farm, Existing Isovist Area Graph

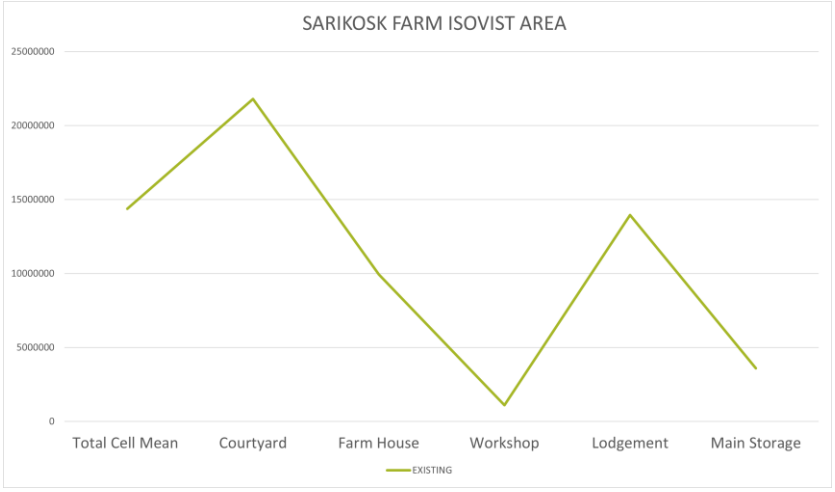


Figure 149: Sarikosk Farm, Isovist Area Values Line Graph

Here is the isovist area ranking of the spaces in Sarıköşk farm: Courtyard > Lodgement > Farmhouse > Main Storage > Workshop. Even though the farm is not actively used, the wall dividing the courtyard in half and the separate yards for the lodgement farmhouse provide important variables regarding farm design organization. The two-story farmhouse allows visual access to all courtyards, but agricultural work and socializing occur on the ground floor, so they are visually separated. Therefore, a low isovist area value for the farmhouse or a high value for the lodgement does not necessarily mean that one is more active in agricultural work than the other. The passage from the farmhouse's ground floor to the lodgement courtyard proves this.

As a result, the centre of the courtyard on this farm was accepted as the average of the centres of the two courtyards. However, it is possible to say that the farmhouse itself is an organizational structure that plays the role of the centre of the courtyard.

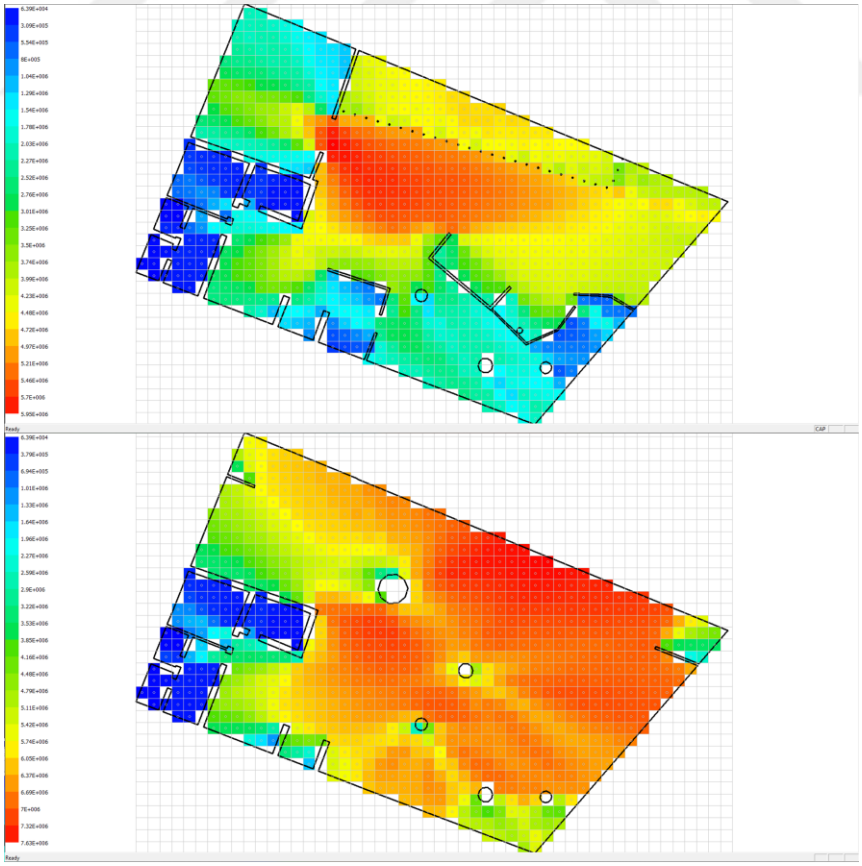


Figure 150: Eski Teke Farm, Preliminary and Existing Isovist Area Graph

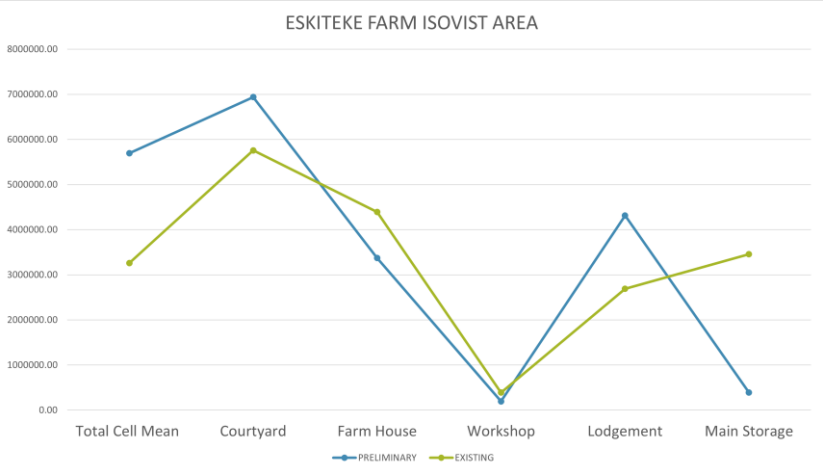


Figure 151: Eski Teke Farm, Isovist Area Values Line Graph

At Eskiteke Farm, the existing isovist area ranking is as follows: Courtyard > Farmhouse > Main Storage > Lodgement > Workshop. The preliminary ranking is Courtyard > Lodgement > Farmhouse > Main Storage. The most important conclusion that can be drawn from this is that in the old situation, the owner of the farm stayed in the farmhouse, but currently, the employee stays there. Therefore, this farm can be considered a workplace where the employee stays, and it can be said that it has a business model similar to that of Çaylaklar Farm.

The isovist graph can be seen above, various additions have been made, and of course, they affect this general picture, but the reason for this table and the additions made is that the farm owner does not need a personal space on this farm. Therefore, the main storage area has been expanded, and the isovist area value has been greatly increased.

Overall, because business functions outweigh living functions on this farm, the line graph that includes both the preliminary and existing situations does not show parallelism. That is a farm where changing the function seriously affects the hierarchies of the areas.

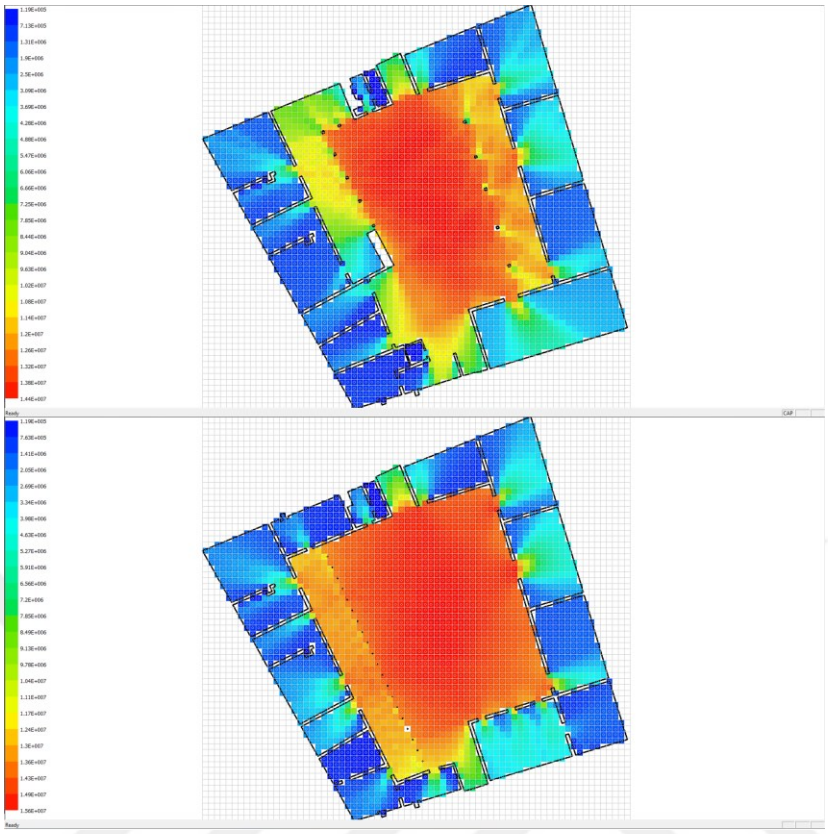


Figure 152: Batakci Kerim Farm, Preliminary and Existing Isovist Area Graph

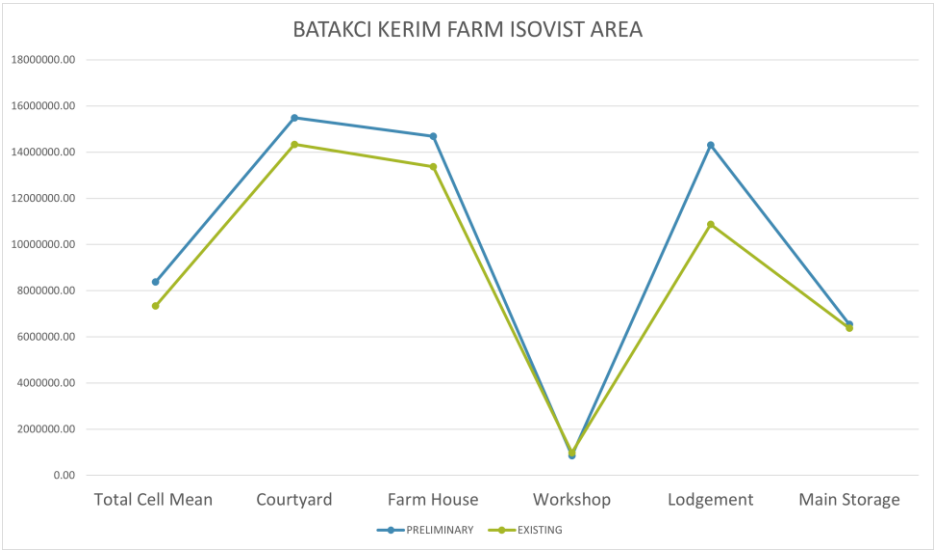


Figure 153: Batakci Kerim Farm, Isovist Area Values Line Graph

At Batakci Kerim Farm, the isovist area ranking is as follows for both conditions: Courtyard > Farmhouse > Lodgement > Main Storage > Workshop. This situation is very similar to Sapandere Farm, with one of the additional factors affecting the change being the expansion of

the farmyard. The common factor is that both farms had at least three families in their previous states but now only have one. Therefore, it is possible to say that the courtyard has lost its collective communal living functions and has started to become more of a workplace, with the lodgement becoming a parking area.

As seen in the isovist area figure above, in the preliminary state, there are four apartments on the left side, and in the lower left corner, there is a common kitchen for all of them. This area used to be a social area where people spent time together, but now it has turned into storage and workshop areas. It can be said that the addition of structures in front of the courtyard kitchen has reduced the isovist area values and turned it into a less visible form from the courtyard.

Due to the loss of common social functions at Batakci Kerim Farm, isovist area values are lower in the existing situation. Therefore, it would not be correct to say that communal living areas where human life exists create privacy and enclosed spaces for farms. On the contrary, while there is an organization where both social and work life is carried out together, there is a transformation into a farm becoming only a working area.

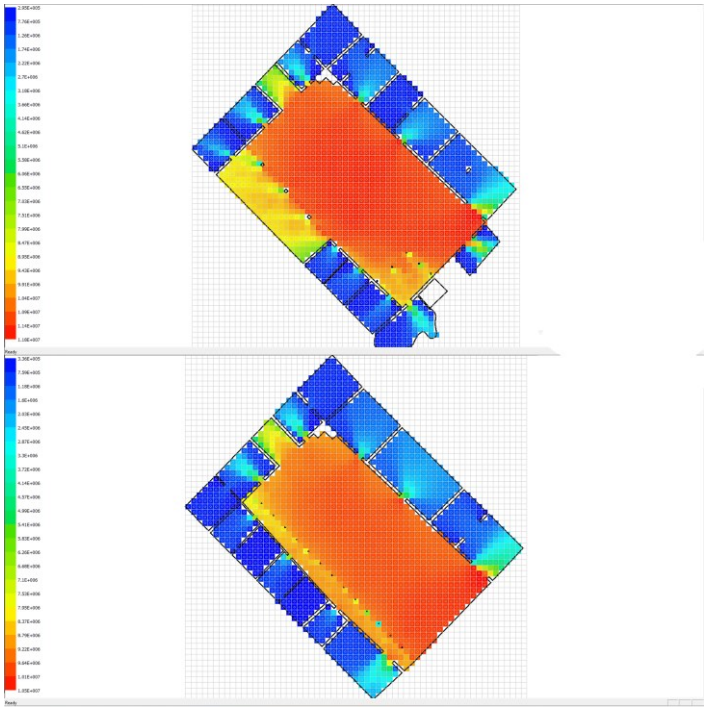


Figure 154: Kozacilar Farm, Preliminary and Existing Isovist Area Graph

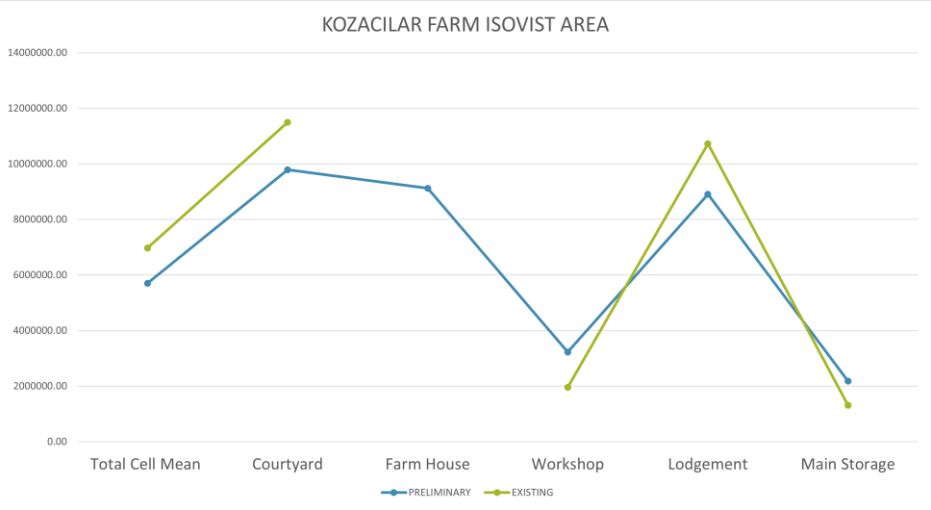


Figure 155: Kozacilar Farm, Isovist Area Values Line Graph

The preliminary isovist area ranking of Kozacılar Farm is as follows: Courtyard > Farmhouse > Lodgement > Main Storage > Workshop. The existing ranking is Courtyard > Lodgement > Main Storage > Workshop. As seen, the function of the farmhouse no longer exists, and only a guard responsible for agricultural work resides on the farm. Therefore, we can say that the farm has lost its social space for workers and owners.

As shown in the coloured isovist area graph above (Figure 154), the lodgings on the left side have been transformed into open storage and office spaces. The farm has become more like a corporate business than a social working environment. The isovist area values have increased due to the changing and seasonal workers for agricultural work, making everything more easily accessible.

Overall, Kozacılar Farm has lost its social function and no longer has resident families, making it more like a corporate business with workers during work hours. That is why the isovist area values have increased, as it is easier to direct workers and control the farm in this way. As seen in the figure above (Figure 155), an additional area with low visibility has been added on the lower left, an open seating area accessible only to the farm owner. This social space is even separated from the farm.

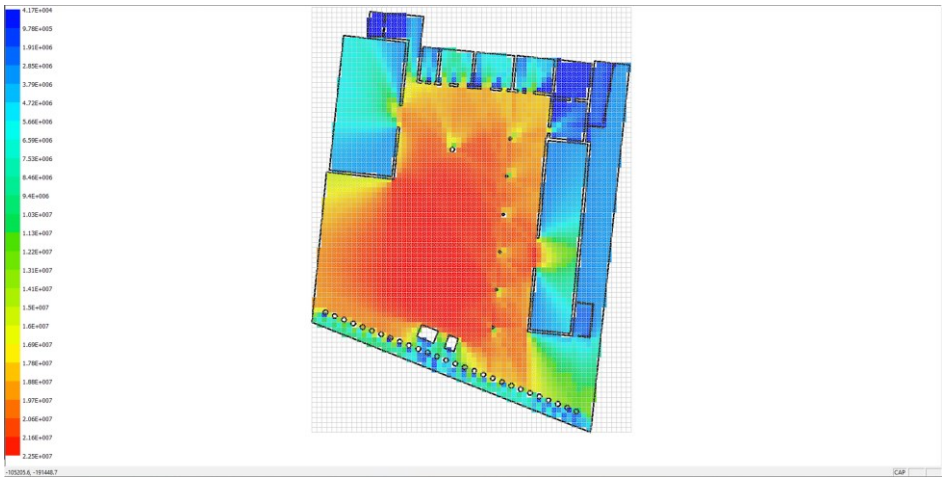


Figure 156: Karmutogullari Farm, Existing Isovist Area Graph

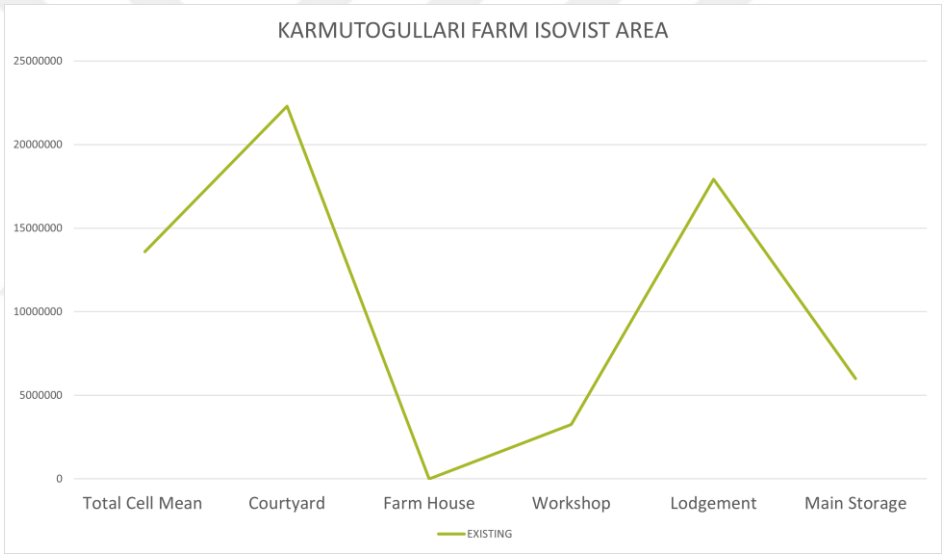


Figure 157: Karmutogullari Farm, Isovist Area Values Line Graph

The isovist area ranking of Karmutoğulları Farm is as follows; Courtyard > Lodgement > Main Storage > Workshop. This farm shows similarities with Kozacılar Farm, but it was impossible to compare the former situation since the plans could not be accessed.

As seen in the graph above (Figure 157), one of the least visible areas is the farm owner's private workshop and the chicken coops on the right side. We can understand from this that when the farm owner creates a personal space, the visibility of these areas falls behind the agricultural work functions. Consequently, this farm prioritizes business functions over social life.

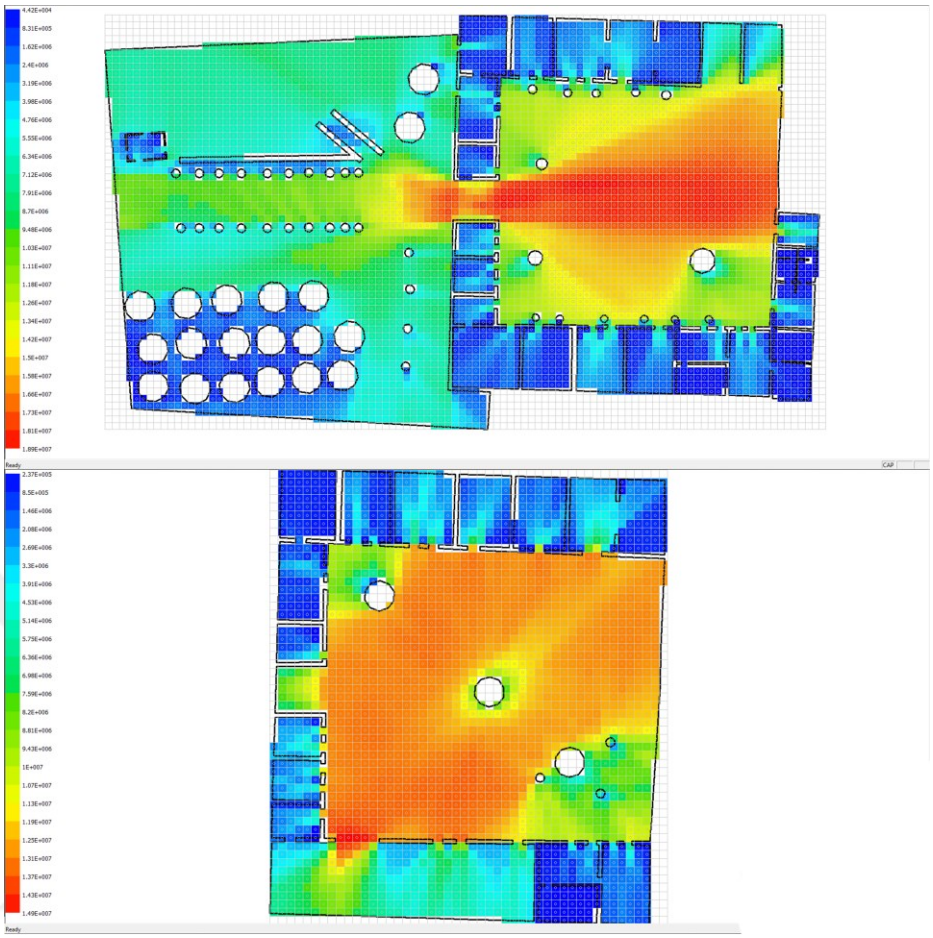


Figure 158: Ovadan Farm, Preliminary and Existing Isovist Area Graph

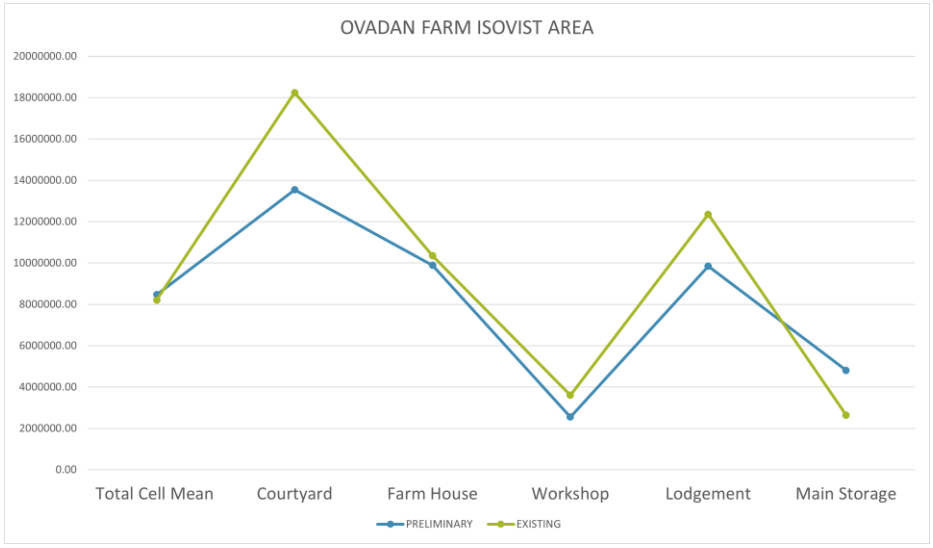


Figure 159: Ovadan Farm, Isovist Area Values Line Graph

Here is the preliminary isovist area ranking of Ovadan Farm: Courtyard > Lodgement > Farmhouse > Main Storage > Workshop. Courtyard > Lodgement > Farmhouse > Workshop > Main Storage is the existing ranking. The preliminary situations of Sapandere, Kozacılar, and Batakçı Kerim Farm are quite similar to this farm. Nowadays, the farm owner is not actively living there, but the collective life of the employees continues. The biggest difference from its past is that it has an agriculture engineer responsible for the storage areas due to his involvement in agriculture. Therefore, the storage area has become one of the least visible areas.

Generally, since greenhouse farming is being practised on this farm, there is a need for employees throughout the year, so an active social life continues. Therefore, the old functions continue, and the rankings of the isovist area regions are similar.

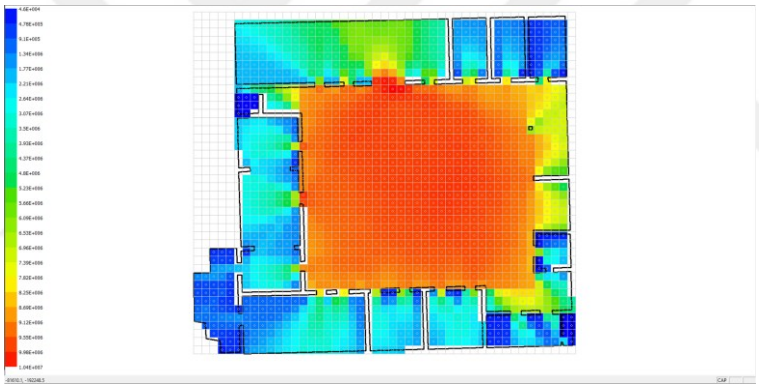


Figure 160: Historical Huzurkent Farm, Preliminary and Existing Isovist Area Graph

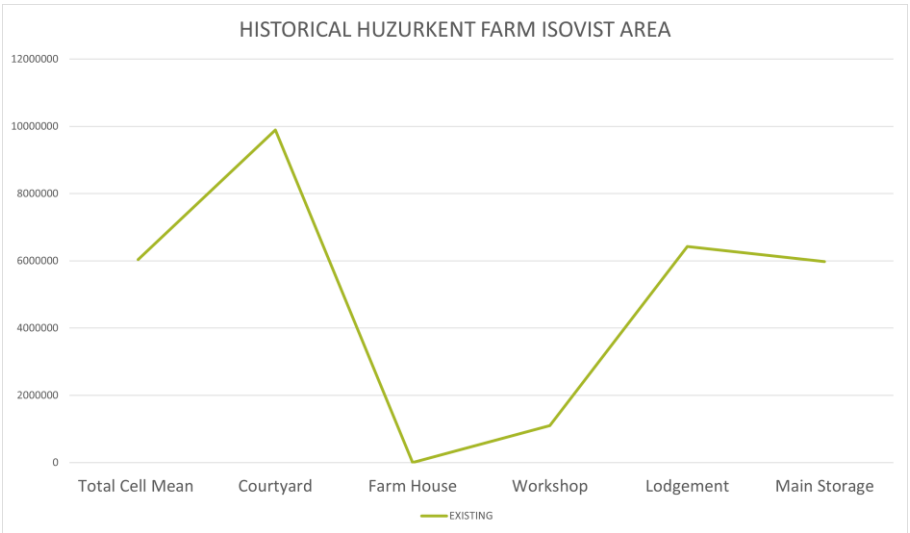


Figure 161: Historical Huzurkent Farm, Isovist Area Values Line Graph

Here is the isovist area ranking of Historical Huzurkent Farm: Courtyard > Lodgement > Main Storage > Workshop. The existing status of Kozacilar and Karmutogullari farms shows great similarity to their isovist area graphs. That is because the farm is operated like a corporate business. As a result, storage areas become one of the most visible places.

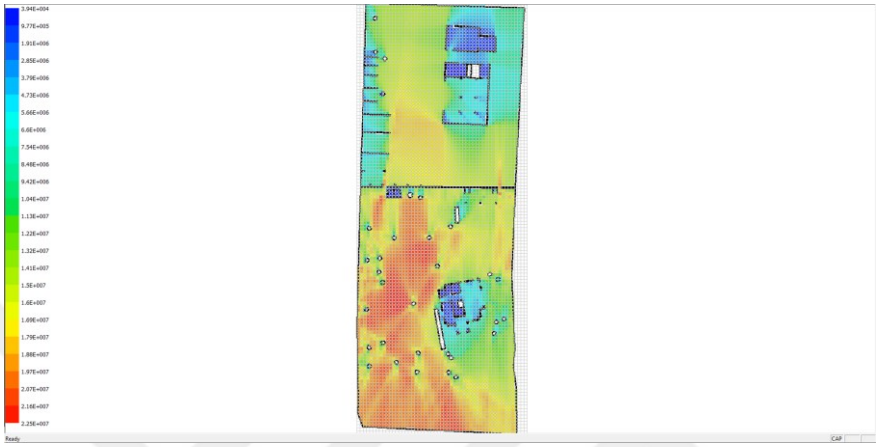


Figure 162: Kubilay Farm, Preliminary and Existing Isovist Area Graph

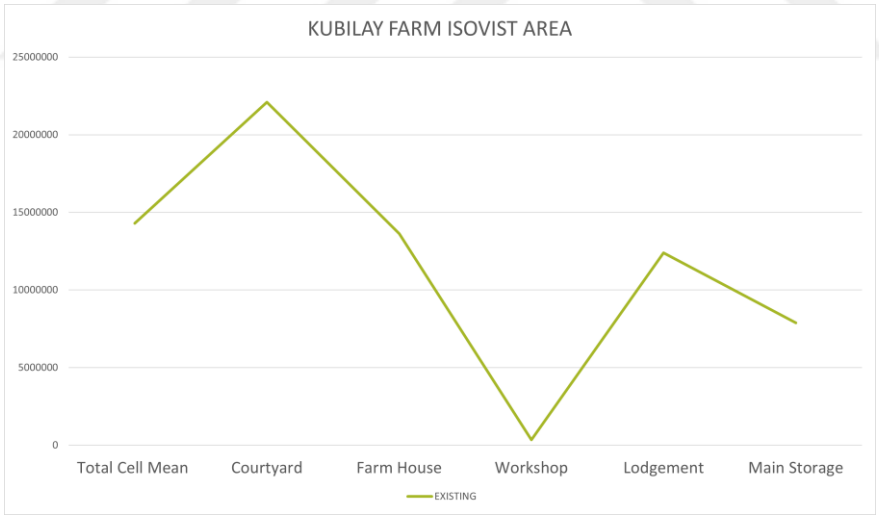


Figure 163: Kubilay Farm, Isovist Area Values Line Graph

The isovist area ranking of Kubilay Farm is as follows; Courtyard > Farmhouse ≥ Lodgement > Main Storage > Workshop. Despite being the newest farm within the scope of this study, its overall ranking is similar to that of other farms. However, the main storage area is not close to the workshop because this farm is operated as a corporate business. Although the farm

accommodates the owner and the employees and various social functions, the agricultural courtyard and the owner's courtyard are separate.

In general, it is impossible to establish a relationship between the farmhouse and other functions of Kubilay Farm due to its sharp separators. That is because an architectural organisation is designed to operate two different courtyards.

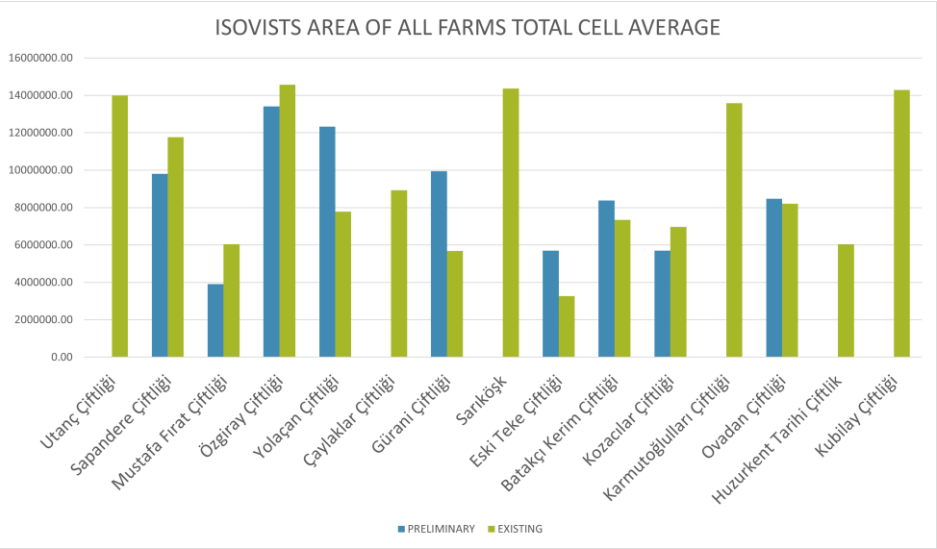


Figure 164: Isovist Area of All Farms Total Cell Average, Bar Graph

As seen in the graph above (Figure 164), except for three farms, the isovist area values of all farms have decreased, while six farms have increased. The primary factor influencing the fluctuation of farm sizes is the presence or absence of an active lifestyle. Farms with ongoing active life tend to exhibit a decrease in the average isovist area, while others experience an increase. Conversely, farms that maintain a social life and expand their area demonstrate the opposite effect, increasing the average isovist value. In essence, farms requiring additional amenities, an architectural structure that accommodates these needs, and sustaining social interactions tend to have higher isovist area values.

Conversely, farms with a planned layout unsuitable for growth are decreasing. It is possible to see an increase in isovist area value in all farms where the business structure is

institutionalized. The isovist area value is only required to remove valuable agricultural equipment and materials from view unless privacy is observed in the spaces.

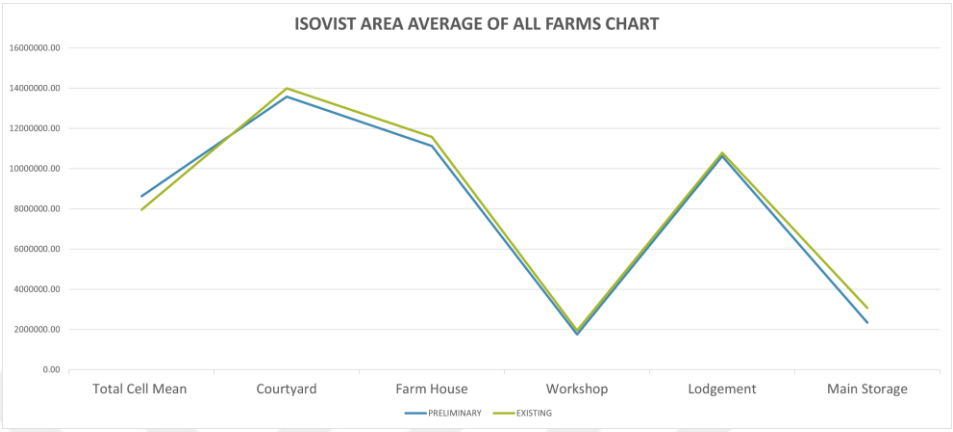


Figure 165: All Farms' Areas Averages, Isovist Area Line Graph

As a result, three main criteria emerge when evaluating farms based on the isovist area:

- Business model (family business, corporate business)
- Farm Users (farm owners, workers)
- Suitability of the farm's architectural organization for growth (farms with buildings surrounding all four sides of the courtyard or not)

We can come to a clear judgment about the isovist area in farms. Otherwise, as seen in the graph above (Figure 165), while all area values have increased, we see that the average cell value has decreased nowadays. That is because the sizes of farms and the usage models of the same function areas can vary greatly according to the above three factors. As a result, if a general acceptance is to be made, we can say that privacy is now stronger, and as the socio-economic class difference increases, this difference tends to decrease the isovist area value in spaces.

5.2.2. Isovist Perimeter

The relationship between the length and width of spaces within farms can be analyzed using the isovist perimeter parameter. Even though areas with the same overall area may exhibit different aspect ratios, farms generally share similar functions, allowing for conclusions to be drawn regarding the aspect ratios of farm spaces based on observations. However, numerical data is essential to provide a more comprehensive understanding and facilitate comparisons among all farms in their current and before-after situations. Particularly, comparing the isovist perimeter can serve as an important criterion since it implies that farm spaces may have similar proportions and areas if they demonstrate resemblance.

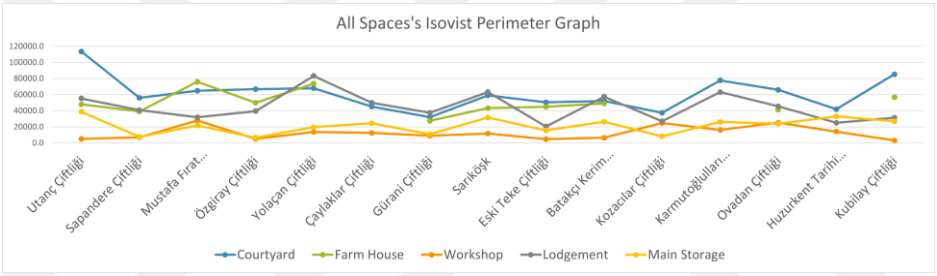


Figure 166: All Farm's Spaces Isovist Perimeter Line Graph

As shown in the graph above , the perimeter values of all locations except for the farmhouse and lodgement are quite similar. Only Utanç, Kubilay, Karmutoğulları, and Ovadan farms disrupt the linearity in the courtyard. We can say this is due to the large number of elements in their courtyards or their organization with two courtyards.

The line graph movements are quite similar if we compare them with the graph that includes the isovist area of all locations (Figure 166). Therefore, it can be concluded that the variations in the isovist perimeter graph exhibit a proportional relationship with the area under consideration.

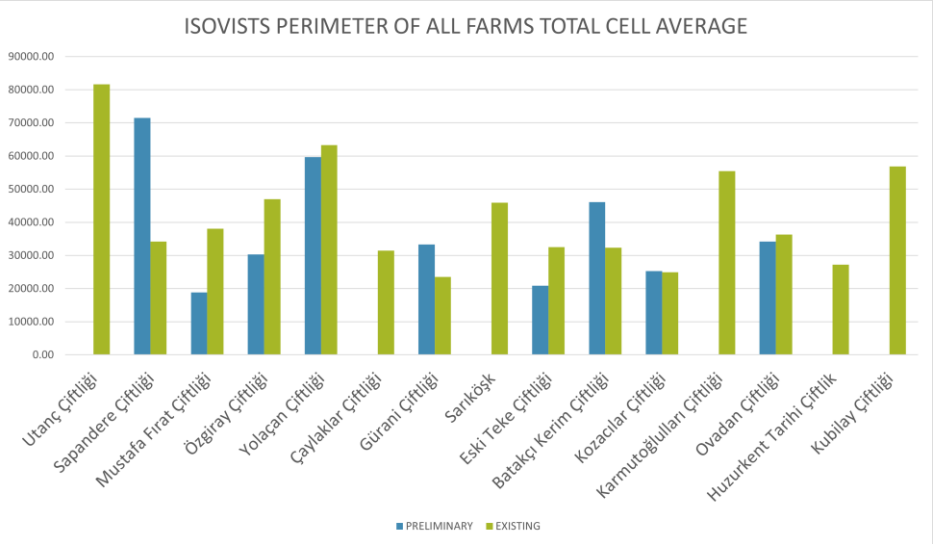


Figure 167: Isovist Perimeter of All Farms Total Cell Average, Bar Graph

Comparing the above graph (Figure 167) with the total cell average graph of the isovist area , we can say there is a significant similarity. Only Sapandere, Yolaçan, and Eski Teke farms disrupt this ratio, as seen in the figure below (Figure 168), due to the perimeter values taken from the points being greatly increased by the fences.

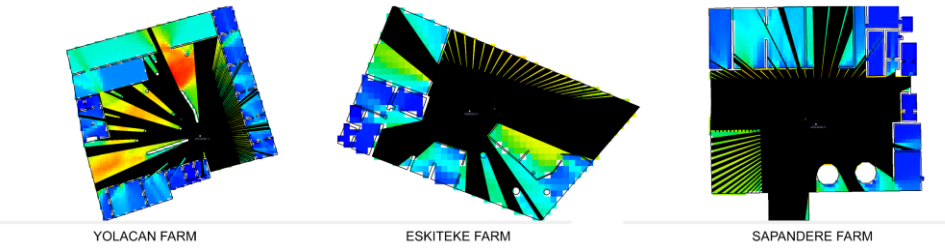


Figure 168: Yolacan, Eskiteke and Sapandere Farms' Courtyards Isovist Points

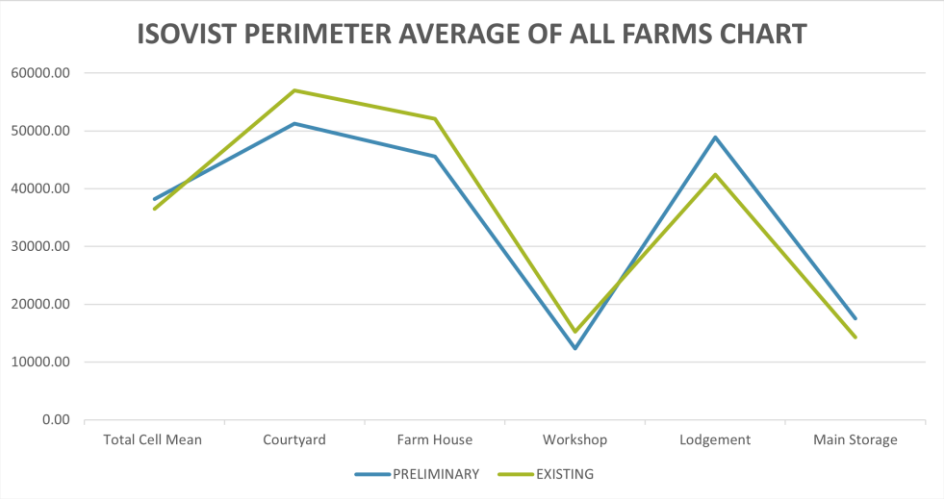


Figure 169: All Farms' Areas Averages, Isovist Perimeter, Line Graph

As a result, the graphs of the isovist area average of all farms (Figure 168) and the isovist perimeter average of all farms (Figure 169) are in the same proportion. Therefore, we can say that there is a parallelism between the height-to-length ratios of farmers' spaces, and differentiation is not seen in the isovist perimeter. We can accept the perimeter evaluation as the same as the evaluation made within the farms.

5.2.3. Occlusivity

The relationship between the openness or closedness of farm spaces can be discussed with the occlusivity parameter. Although it seems related to the isovist area, there is a direct difference between the visible area calculation from a selected point and the access to that point, the closure of the area with various elements, which is already evident in the non-parallel situations in the line graphs. The farms generally have similar functions, and as a result of observations, it can be predicted that the occlusivity values of small spaces in the deepest points of the spaces in farms are low. However, a superficial conclusion can be reached about these spaces, so it is important to measure this closure status to make analytical comparisons. Occlusivity was chosen in the scope of the study, especially to see the differences and similarities between social spaces and to understand the change. However, this analysis will be carried out in section 5.4, and the general closure status and preliminary-existing status of the spaces will be examined in this section.

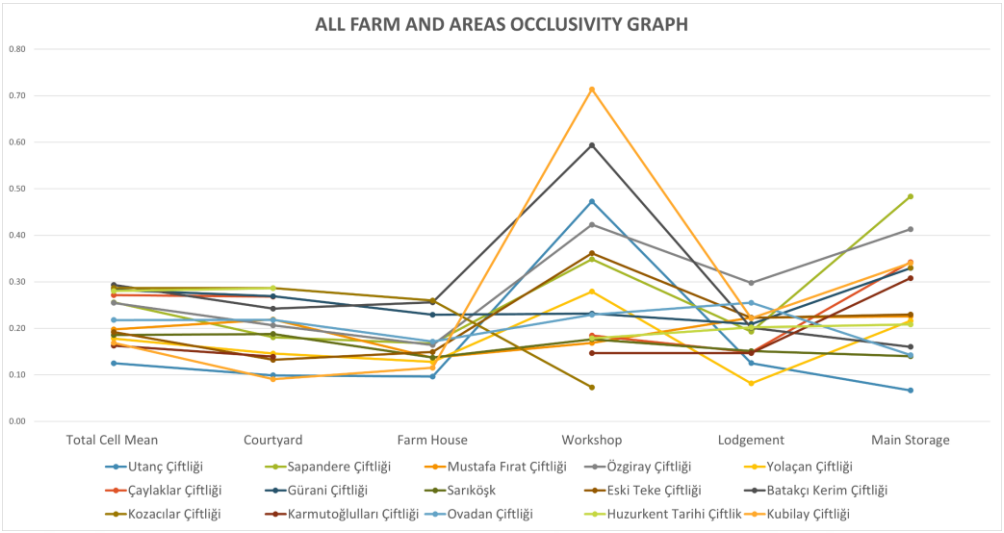


Figure 170: All Farms' Areas Occlusivity, Line Graph

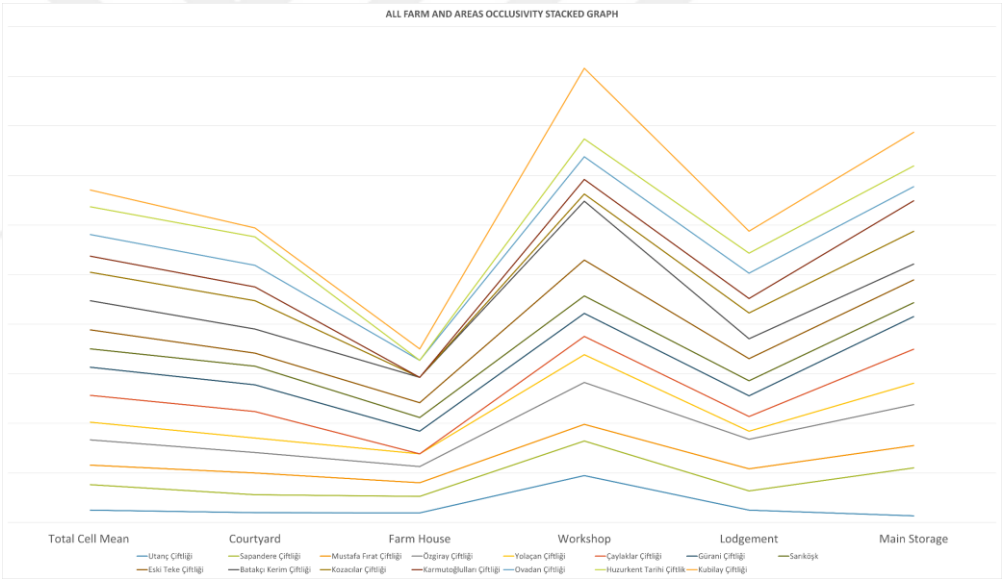


Figure 171: All Farms' Areas Occlusivity, Stacked Line Graph

As shown in the above graph, farms are in a similar occlusivity hierarchy when considered separately. Since the readability of this is not easy in the first graph (Figure 170), a second graph (Figure 171) has been created. The second graph shows the x rank of the farms within themselves, not among themselves. In other words, it shows the occlusivity values drawn within each farm. From this, we can reach a very clear conclusion. The most occlusive space is the workshop area, while the least occlusive space is the courtyard, as it is expected to be the lowest since it is directly accessed upon entering the farm, but when the isovist area values of the workshop and main

storage areas are ranked, it is not possible to reach a direct conclusion. However, by looking at occlusivity, we can say that the most enclosed space is the workshop as it contains much special and valuable equipment, and it is natural for them to be in the most enclosed spaces.

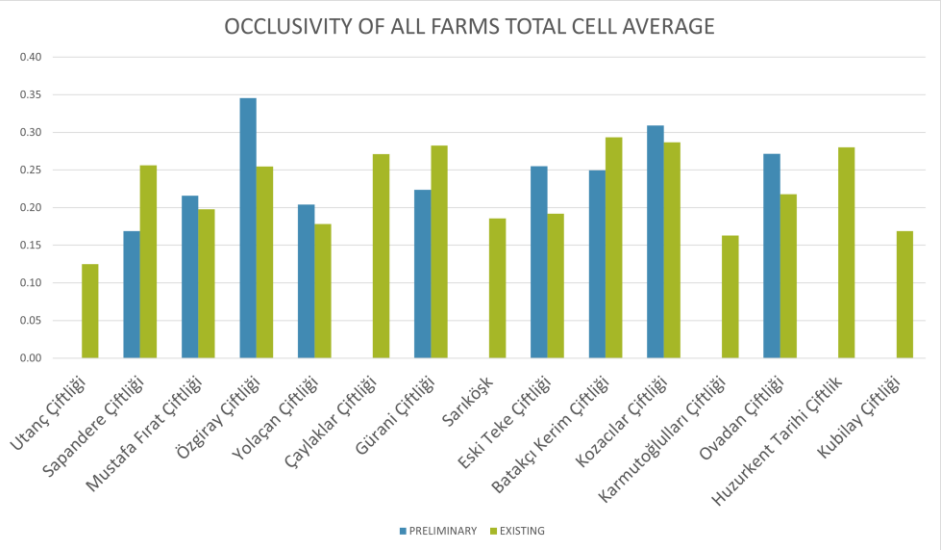


Figure 172: Occlusivity of All Farms Total Cell Average, Bar Graph

As seen in the graph above, except for three farms, all had more occlusive averages. The main reason for this is that the walls of the accommodation areas in these farms, which previously housed many more people, were demolished and turned into storage or semi-open parks, so these areas have become more open spaces. In other words, while an accommodation area hosts more occlusive spaces, storage and park areas do not, so the change in function has affected this graph (Figure 172). The reason for the higher occlusive average in the Sapandere farm today is that as the farm area grows, the inter-space closure value decreases, and the entrances of the old stables, which were made for horses and had wide openings, are now left with narrower openings for cows. In the Gürani Farm, separating the courtyard area according to various landscape functions is unique and is outside the average. Batakçı Kerim Farm's success is attributed to installing toilets in the courtyard and allocating more rooms to old accommodation areas. Because the previously used areas as storage became dysfunctional due to neglect, turning the old lodgings into storage was a less costly solution, so the occlusivity values in Batakçı Kerim Farm have increased.

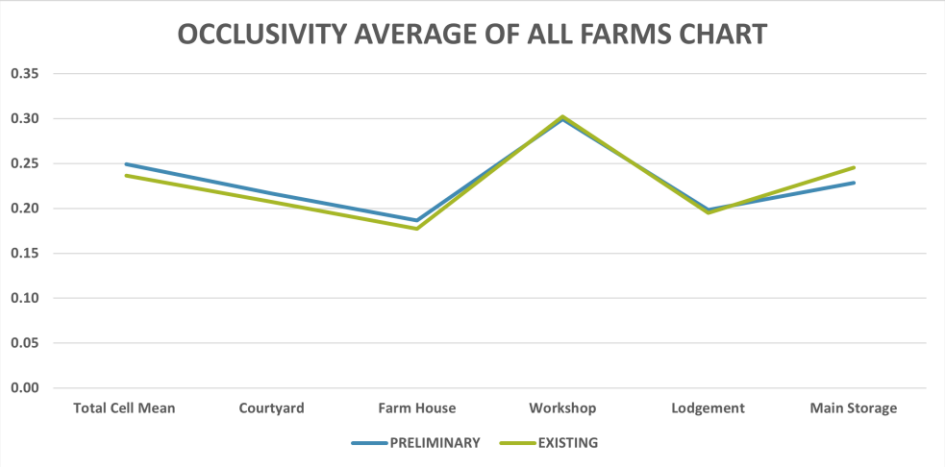


Figure 173: All Farms' Areas Averages, Occlusivity, Line Graph

Generally, we can say that farms have become less occlusive today. Because there is no longer a need for housing as much as before, all these areas have turned into various storage areas and open/closed parking areas. Only storage areas have become more occlusive because modern agriculture requires much more agricultural equipment and materials, and main storage areas have been categorized, which has increased the average occlusivity.

5.2.4. Isovist Data Results

Isovist data analysis has been conducted in this section regarding the preliminary and existing conditions of the farms. Isovist area, isovist perimeter, and occlusivity parameters have been used in this analysis. In discussing the relationships between the prominent areas within farms and the isovist area and perimeter parameters, the occlusivity parameter is employed to identify the areas within farms that are more enclosed, less accessible, and have lower visibility than other locations.

According to the analysis results, the changes in visibility status in farms in Cukurova and the reasons for these changes were discussed through graphs created from the average isovist area values of the farms. It was revealed that there is a common relationship between the visibility of the spaces in the farms. Generally, if we sort from the most visible to the least visible, courtyard > farmhouse≥ lodging > main storage > workshop are listed. The isovist area graphs discussed the distinction between courtyard, farmhouse, and lodging for all farms.

Furthermore, relationships between the spaces in the farms were analyzed, and the preliminary and existing situations of the farms were compared. Although the spatial hierarchy did not change between the pre-and post-situations, the isovist area values increased due to the changes in the use of spaces and the opening of additional areas in the farms. The expansion of storage areas and increased parking spaces are key factors contributing to this growth.

Additionally, it has been determined that field-study questions must be answered to understand the significant differences between farms in the analysed points in the isovist data. These include the farm's operational model, the residents and their roles, and whether the farm has expandable land, which can be examined under three headings. Without this data, it will not be possible to read and analyze the mismatched points between farms, or the analysis will be more superficial.

These analysis results can provide important information to farm owners about the visibility and use of the spaces on their farms. Especially spaces such as the courtyard, farmhouse, and lodgement stand out as areas that require more visibility. However, their location is important as their internal organization has been excluded from the scope of the analysis due to the lack of similarity or commonality in their design, and therefore considered separately from the space syntax analysis.

Furthermore, considering the changing uses of farms, the locations of spaces may need to be rearranged according to their functions. The results of this analysis could provide an important basis for decisions to increase farm movement efficiency.

The analyses presented in this section provide a comprehensive view of farms' preliminary and existing plans. Isovist data analysis provides important information about the visibility and use of spaces on farms. As a result, farm owners can make more informed decisions on topics such as space hierarchy, use changes, and spatial organization.

In conclusion, isovist data analysis is an important tool for increasing farm efficiency and understanding how they function, providing farm owners with a comprehensive view. These

analyses can be used to compare the before and after states of farms and rearrange the functions and locations of spaces on farms.

5.3. Graph Data Analysis

In this section, the graph parameters selected for both the preliminary and existing conditions of farms will be examined. These parameters are connectivity, mean depth, and integration. Connectivity will be evaluated based on the number of direct and potential connections in the farms. In other words, connectivity data will be interpreted based on how easily farm users can move between spaces. Although a common relationship is expected between connectivity and integration, the most important difference is that connectivity measures how easily farm users can move between spaces.

In contrast, integration measures how connected space is to all other farm areas. Therefore, user-focused interpretations will be made when looking at connectivity, and space and farm-focused interpretations will be made when looking at integration. Finally, mean depth is created by finding the average distance between each unit and other units in the grid structure. That allows us to understand how deep a selected unit or units are compared to others. As a result, it will enable us to interpret the design and functionality of space networks.

As a result, the numerical graph values obtained will be visualized using various histograms and graphs to make them easier to read. This way, relationships between graph values and farms can be analyzed. Graphs created from farm graph value averages will also be used to discuss why and how the visibility status in farms in the Cukurova region changed, and when interpreting these values, it will be considered which spatial and user-focused qualitative data of the farms should be considered.

Table 9: All Existing Graph Data's Values

CASE	Connectivity	Connectivity	Connectivity	Connectivity	Connectivity	Connectivity
EXISTING	Total Cell Mean	Courtyard	Farm House	Main Storage	Lodgement	Workshop
Utanç Çiftliği	1405.548663	2117	1460	329	1745	67
Sapandere Çiftliği	1174.967526	1931	1548	108	1537	80
Mustafa Fırat Çiftliği	603.910334	1384	1373	495	784	455
Özgiray Çiftliği	1453.309091	2094	1687	95	1963	63
Yolaçan Çiftliği	780.507874	1312	1207	518	676	281
Çaylaklar Çiftliği	891.022356	1451		959	806	380
Gürani Çiftliği	567.9934853	1070	654	155	874	182
Sarıköşk	1434.724275	2175	995	361	1401	113
Eski Teke Çiftliği	324.9331873	577		346	434	36
Batakçı Kerim Çiftliği	733.7649186	1442	1340	638	1090	94
Kozacılar Çiftliği	696.4165325	1151		129	1072	198
Karmutoğlulları Çiftliği	1357.987041	2230		598	1805	326
Ovadan Çiftliği	823.4103093	1829	1029	261	1232	359
Huzurkent Tarihi Çiftlik	602.5532178	993		598	643	111
Kubilay Çiftliği	1429.359757	2205	1359	787	1242	31
COUNT	15	15	15	10	15	15
AVERAGE	952.03	1597.40	1265.20	425.13	1153.60	185.07
CASE	Mean Depth	Mean Depth	Mean Depth	Mean Depth	Mean Depth	Mean Depth
EXISTING	Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği	1.74025369	1.4766	1.7291	3.0096	1.6304	2.1115
Sapandere Çiftliği	2.000459304	1.598	1.727	2.4213	1.8787	2.6207
Mustafa Fırat Çiftliği	2.260267518	1.7995	1.7454	2.3607	2.0292	2.1783
Özgiray Çiftliği	1.826178039	1.4051	1.617	2.6737	1.4554	2.5239
Yolaçan Çiftliği	2.000705443	1.6655	1.6959	2.2203	1.9966	2.103
Çaylaklar Çiftliği	1.721612523	1.3791		1.9978	1.6773	1.6936
Gürani Çiftliği	1.984333793	1.5987	1.7831	2.1178	1.63	2.1448
Sarıköşk	1.633980325	1.4245	1.7774	2.0101	1.6285	1.9189
Eski Teke Çiftliği	1.794733946	1.4145		2.3443	1.5428	1.7094
Batakçı Kerim Çiftliği	1.979530412	1.5271	1.5434	2.4863	1.6762	1.9331
Kozacılar Çiftliği	1.808488913	1.3963		2.058	1.5064	2.2873
Karmutoğlulları Çiftliği	1.810223334	1.4175		2.1129	1.6146	2.0321
Ovadan Çiftliği	2.183731033	1.6845	2.167	2.3522	1.9464	2.3927
Huzurkent Tarihi Çiftlik	1.714284392	1.3994		2.117	1.6557	1.6805
Kubilay Çiftliği	1.97517885	1.7714	1.9744	3.3876	1.9725	2.4668
COUNT	15	15	10	15	15	15
AVERAGE	1.90	1.53	1.78	2.38	1.72	2.12
CASE	Integration	Integration	Integration	Integration	Integration	Integration
EXISTING	Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği	4576568.747	7000584.835	5034181.969	69824.2348	6031847.244	693668.2307
Sapandere Çiftliği	3329881.949	5913873.187	4898799.71	179815.2085	4712127.444	129320.5029
Mustafa Fırat Çiftliği	1333779.005	3355977.265	3309195.932	872827.2683	1853652.8	1085139.301
Özgiray Çiftliği	4327661.251	6184124.842	5156809.394	58777.2818	5906308.926	97235.7433
Yolaçan Çiftliği	1771423.95	3243300.138	2891782.408	541258.0335	1467858.98	918402.47
Çaylaklar Çiftliği	2084322.942	3465749.775		751453.1553	1890821.722	2166966.112
Gürani Çiftliği	807443.0589	1606106.525	1016816.456	256203.0737	1016816.456	149410.8449
Sarıköşk	4761253.606	7283558.427	3149028.217	335779.3133	4603383.288	1181475.42
Eski Teke Çiftliği	245834.022	444264.7119		15424.6806	348012.6388	247175.1686
Batakçı Kerim Çiftliği	1576892.455	3208818.751	2994413.246	127182.1371	2387061.341	1256283.301
Kozacılar Çiftliği	1340833.026	2244478.749		300681.766	2154955.198	136821.594
Karmutoğlulları Çiftliği	4624104.116	7874364.268		1094445.314	6342772.133	1659845.767
Ovadan Çiftliği	2173524.6	5192626.622	2979584.953	814306.2968	3446568.292	569254.284
Huzurkent Tarihi Çiftlik	994536.3442	1676104.873		146794.4662	1130587.24	933540.6222
Kubilay Çiftliği	5045389.329	8100254.579	5062593.3	50826.8239	4295388.676	2355427.105
COUNT	15	15	10	15	15	15
AVERAGE	2599563.23	4452945.84	3649320.56	374373.27	3172544.16	905331.0977

Table 10: All Preliminary Graph Data's Values

CASE	Connectivity	Connectivity	Connectivity	Connectivity	Connectivity	Connectivity
PRELIMINARY	Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği						
Sapandere Çiftliği	978.51	1694.00	1312.00	68.00	241.00	201.00
Mustafa Fırat Çiftliği	390.37	706.00	528.00	30.00	475.00	98.00
Özgiray Çiftliği	1337.42	1891.00	1671.00	40.00	1863.00	89.00
Yolaçan Çiftliği	1234.96	2073.00	1728.00	504.00	2043.00	148.00
Çaylaklar Çiftliği						
Gürani Çiftliği	991.38	1274.00	1032.00	238.00	1185.00	162.00
Sarıköşk						
Eski Teke Çiftliği	567.21	694.00	336.00	20.00	427.00	36.00
Batakçı Kerim Çiftliği	836.99	1541.00	1463.00	82.00	1417.00	649.00
Kozacılar Çiftliği	570.09	982.00	909.00	321.00	883.00	216.00
Karmutoğlulları Çiftliği						
Ovadan Çiftliği	846.04	1347.00	991.00	263.00	991.00	500.00
Huzurkent Tarihi Çiftlik						
Kubilay Çiftliği						
COUNT	**9**	**9**	**9**	**9**	**9**	**9**
AVERAGE	**861.44**	**1355.78**	**1107.78**	**174.00**	**1058.33**	**233.22**
CASE	**Mean Depth**	**Mean Depth**	**Mean Depth**	**Mean Depth**	**Mean Depth**	**Mean Depth**
PRELIMINARY	**Total Cell Mean**	**Courtyard**	**Farm House**	**Workshop**	**Lodgement**	**Main Storage**
Utanç Çiftliği						
Sapandere Çiftliği	1.81	1.43	1.59	2.31	2.15	2.20
Mustafa Fırat Çiftliği	1.85	1.49	1.67	2.70	1.70	2.06
Özgiray Çiftliği	1.77	1.39	1.53	2.79	1.39	2.56
Yolaçan Çiftliği	1.83	1.45	1.58	2.05	1.48	2.52
Çaylaklar Çiftliği						
Gürani Çiftliği	1.68	1.43	1.56	2.03	1.49	2.11
Sarıköşk						
Eski Teke Çiftliği	1.45	1.26	1.65	2.55	1.54	2.16
Batakçı Kerim Çiftliği	1.88	1.47	1.52	2.40	1.53	1.92
Kozacılar Çiftliği	1.97	1.50	1.61	2.00	1.58	2.23
Karmutoğlulları Çiftliği						
Ovadan Çiftliği	1.76	1.45	1.63	2.04	1.61	1.88
Huzurkent Tarihi Çiftlik						
Kubilay Çiftliği						
COUNT	**9**	**9**	**9**	**9**	**9**	**9**
AVERAGE	**1.78**	**1.43**	**1.59**	**2.32**	**1.61**	**2.18**
CASE	**Integration**	**Integration**	**Integration**	**Integration**	**Integration**	**Integration**
PRELIMINARY	**Total Cell Mean**	**Courtyard**	**Farm House**	**Workshop**	**Lodgement**	**Main Storage**
Utanç Çiftliği						
Sapandere Çiftliği	2362726.25	4123436.33	3415888.19	102667.16	561779.20	325615.76
Mustafa Fırat Çiftliği	390272.24	740407.96	547501.95	16335.95	503554.57	79138.40
Özgiray Çiftliği	4166970.38	5925886.88	5262317.28	32484.19	5863905.19	85369.26
Yolaçan Çiftliği	4010915.62	6777027.17	5731527.71	1378314.43	6728948.91	213017.94
Çaylaklar Çiftliği						
Gürani Çiftliği	2314932.39	2980430.17	2388537.37	519043.42	2827195.26	198576.43
Sarıköşk						
Eski Teke Çiftliği	798673.35	960987.34	453127.80	7447.27	595893.01	21016.87
Batakçı Kerim Çiftliği	2076416.84	3878829.58	3737095.02	98078.88	3563230.04	1545661.65
Kozacılar Çiftliği	861216.21	1534920.71	1461471.16	451702.10	1390594.68	228833.71
Karmutoğlulları Çiftliği						
Ovadan Çiftliği	1844588.24	2976314.86	2212397.51	524030.69	2200198.39	887361.60
Huzurkent Tarihi Çiftlik						
Kubilay Çiftliği						
COUNT	**9**	**9**	**9**	**9**	**9**	**9.00**
AVERAGE	**2091856.84**	**3322026.78**	**2801096.00**	**347789.34**	**2692811.03**	**398287.96**

5.3.1. Connectivity

Connectivity parameters can be discussed concerning how easily users can access a location on a farm. That will be used to measure how easily users can move to selected locations within the scope of their work. Farm users can be divided into four categories:

- Farm owner
- Employees
- Contractors (Various agricultural and other services taken from outside)
- Special Guests (friends, relatives, etc.)
- Agricultural Guests (visiting engineers, traders, etc.)

These four user models and the points they need to reach can be made superficially through observations or field studies. However, analyzing this with graph data provides a more analytical and quantitative comparison opportunity.

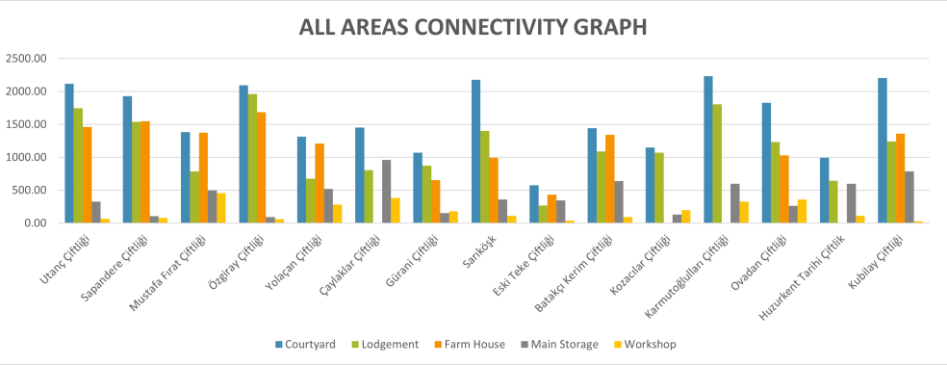


Figure 174: All Farms' Areas Connectivity, Bar Graph

According to the graph above (Figure 174), we see six different connectivity rankings:

- Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop
- Courtyard ≥ Farm House > Lodgement > Workshop > Main Storage
- Courtyard > Lodgement > Farm House > Main Storage > Workshop
- Courtyard > Lodgement > Main Storage ≥ Workshop
- Courtyard > Main Storage > Lodgement ≥ Workshop
- Courtyard > Lodgement> Workshop ≥ Main Storage

We can understand from this that there are six different farm scenarios with transportation and priority. These are categorized according to the farm's operating models and the living situation of the people, and whether there is a relationship is shown in the table below (Table 11).

Table 11: Categorization of Connectivity Ranking

Category Number	Connectivity Rank	Business Model	Farm Owner Accommodation
1	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	Family Bussines	Yes
2	Courtyard > Lodgement > Farm House > Workshop > Main Storage	Manager / Agicultural Engineer	Partial
3	Courtyard > Lodgement > Farm House > Main Storage > Workshop	Corporate	Partial
4	Courtyard > Lodgement > Workshop ≥ Main Storage	Corporate	No
4	Courtyard > Main Storage > Lodgement ≥ Workshop	Corporate	No
4	Courtyard > Lodgement> Workshop ≥ Main Storage	Corporate	No

Table 12: Connectivity Ranking

Farm Name	Connectivity	Connectivity2	Connectivity3	Connectivity4	Connectivity5	Connectivity Rank
	Courtyard	Farm House	Lodgement	Main Storage	Workshop	
Utanç Çiftliği	2117.00	1460.00	1745.00	329.00	67.00	Courtyard > Lodgement > Farm House > Main Storage > Workshop
Sapandere Çiftliği	1931.00	1548.00	1537.00	108.00	80.00	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop
Mustafa Fırat Çiftliği	1384.00	1373.00	784.00	495.00	455.00	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop
Özgiray Çiftliği	2094.00	1687.00	1963.00	95.00	63.00	Courtyard > Lodgement > Farm House > Main Storage > Workshop
Yolaçan Çiftliği	1312.00	1207.00	676.00	518.00	281.00	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop
Çaylaklar Çiftliği	1451.00		806.00	959.00	380.00	Courtyard > Main Storage > Lodgement ≥ Workshop
Gürani Çiftliği	1070.00	654.00	874.00	155.00	182.00	Courtyard > Lodgement > Farm House > Workshop > Main Storage
Sankösk	2175.00	995.00	1401.00	361.00	113.00	Courtyard > Lodgement > Farm House > Main Storage > Workshop
Eski Teke Çiftliği	577.00		434.00	346.00	36.00	Courtyard > Lodgement > Main Storage ≥ Workshop
Batakçı Kerim Çiftliği	1442.00	1340.00	1090.00	638.00	94.00	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop
Kozacılar Çiftliği	1151.00		1072.00	129.00	198.00	Courtyard > Lodgement> Workshop ≥ Main Storage
Karmutoğlulları Çiftliği	2230.00		1805.00	598.00	326.00	Courtyard > Lodgement > Main Storage ≥ Workshop
Ovadan Çiftliği	1829.00	1029.00	1232.00	261.00	359.00	Courtyard > Lodgement > Farm House > Workshop > Main Storage
Hunurkent Tarihi Çiftlik	993.00		643.00	598.00	111.00	Courtyard > Lodgement > Main Storage ≥ Workshop
Kubilay Çiftliği	2205.00	1359.00	1242.00	787.00	31.00	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop

We can categorize farms based on their connectivity order with tables and the management and user variables of the farms. Those in the first category are family businesses whose owners fully control the farm. We can attribute the reason for the second place of the dormitory to this because the entry and exit to the farm are designed first to encounter the farm owner. Storage space is prioritized due to the equipment size in the workshop; accessibility is the last priority because it is under the control of the farm owners. In the second category, there is administrative control because the farm owner does not actively reside but is someone who stays on the farm. Due to the preliminary plan of the farms, the farmhouse is the first place encountered, then the dormitory. The storage area is at the forefront because the workers are responsible for the workshop equipment and are under the control of the manager; because large agricultural equipment, medicines, and fertilizers are valuable materials that are not constantly used, so they are given to workers in a controlled manner by the manager. Farm owners rarely reside in the third category since they are all corporate businesses or partnerships. Therefore, the employees who live in the dormitory also work as guards on the farms and are designed to be the first people encountered, so they come before the farmhouse. One of the residents on the farm is in control of the storage and workshop. The last category is farms completely corporate or partnerships,

generally controlled by a manager, and those who live in the farm's dormitory usually work as guards. The most important determining factor in this category is the absence of a farmhouse. Generally, it is possible to categorize farms according to the connectivity parameter by looking at the human transportation structure. This way, it is possible to design a farm suitable for the user and the type of business in the agricultural model.

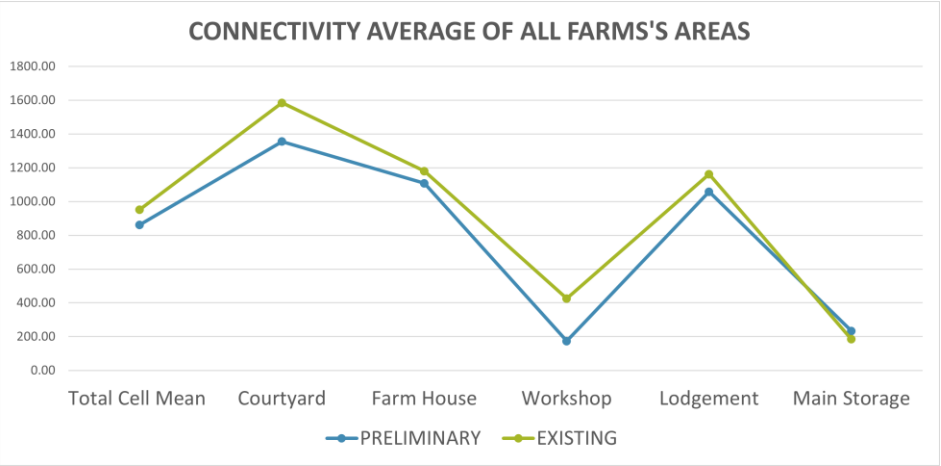


Figure 175: All Farms' Areas Averages, Connectivity, Line Graph

Finally, according to the chart above (Figure 175: All Farms' Areas Averages, Connectivity, Line Graph), we can understand that human movement and transportation in farms have become simpler nowadays. The biggest reason for this is the decrease in users and the increase in obtaining various agricultural services from outside. It is now understood that residents do not only carry out farm and agricultural production; hence, farm transportation has become simpler.

5.3.2. Mean Depth

Mean depth parameters can be used to examine the frequency of use, privacy status, or the actual depth of the spaces in farms, and these situations can be discussed within themselves. In other words, the priority status of the spaces in the system can be determined by looking at whether the selected spaces in the scope of operation of the spaces are deep or not deep in the farms.

First, this section will create a general depth ranking by looking at the bar graph of selected farm spaces. Then, the reasons why the deepest spaces are at that depth will be discussed by individually examining the graphs taken from Syntax 2D of the farms. Finally, depth changes in the past and present will be analyzed through graphs created with the average values of the farms.

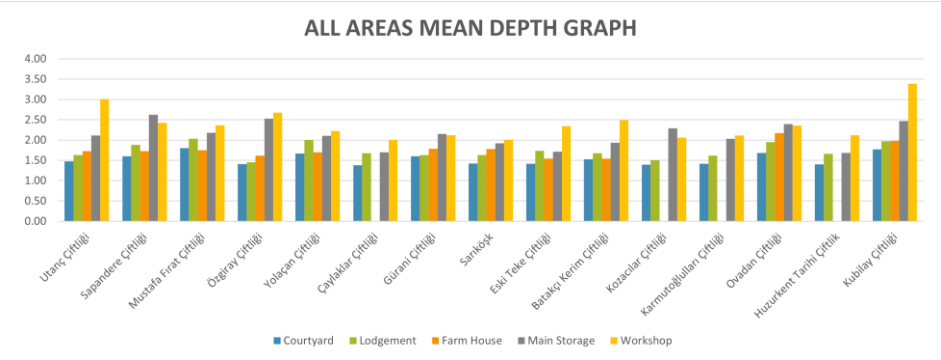


Figure 176: All Farms' Areas Mean Depth, Bar Graph

The bar graph above (Figure 176) shows the current depth values of all farms. According to this graph, we can reach two mean depth rankings:

• Workshop ≥ Main Storage > Lodgement > Farm House > Courtyard

• Workshop ≥ Main Storage > Lodgement > Courtyard > Farm House

According to the graph created from the average values of the farms' spaces, there is almost equality between the lodgement and the farmhouse. The usage status and operating model of farms change the general mean depth scenarios due to this categorization, as stated in the connectivity section (Table 11). When looking at the mean depth, we want to see why each farm's special spaces are the deepest, except for the data in the table (Table 11). Therefore, we will look at each farm's mean depth graphs individually.

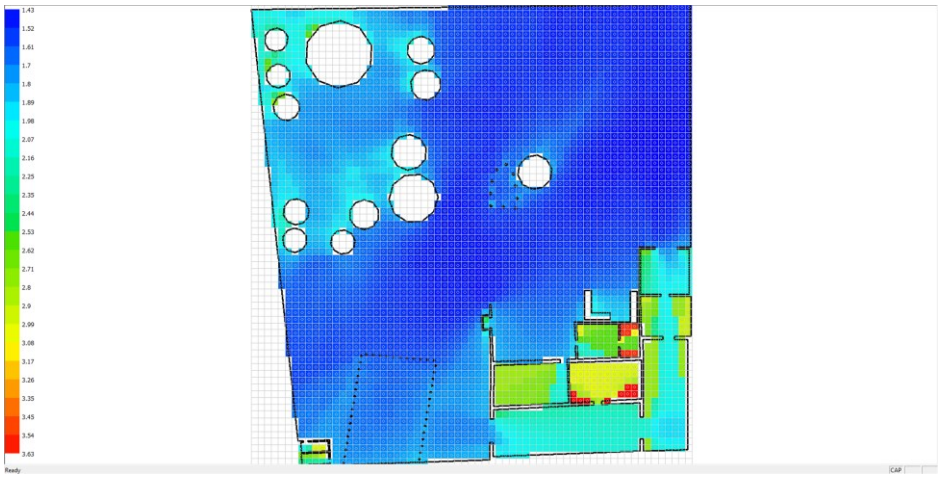


Figure 177: Utanç Farm, Mean Depth Graph

Looking at the Shame Farm graph above (Figure 177), we only see high depth in the office space and the specialized storage area for agricultural chemicals. From this, we can understand that Shame Farm is managed corporately, so the office space is a special area that only managers can use, and the storage of chemicals and fertilizers is a place where stock chemicals are stored; there is no continuous usage, and the materials are valuable, so it is a place under the control of only the manager.

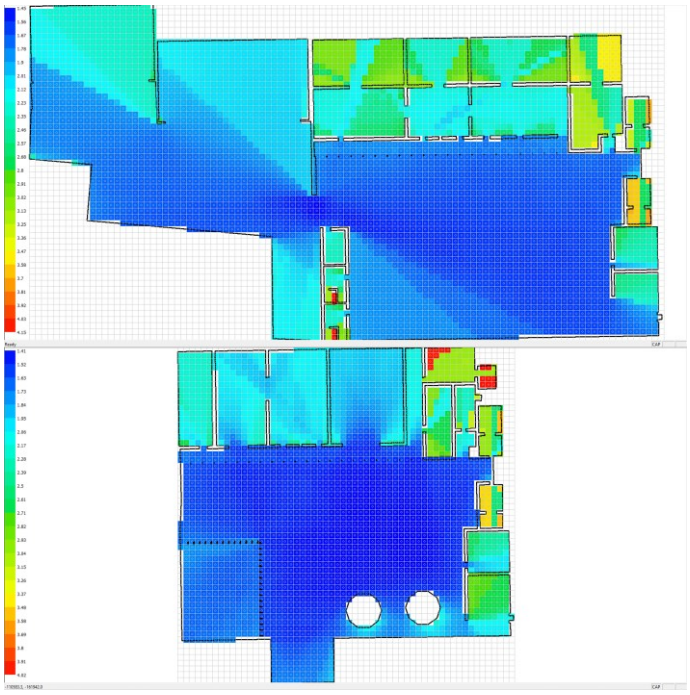


Figure 178: Sapandere Farm, Existing & Preliminary Mean Depth Graph

In the current state of Sapandere Farm, the area near the entrance on the right side appears to be one of the deepest areas. It has been selected for agriculture pesticide storage due to its valuable material and easy loading area near the entrance. Another deep area is the bathroom of the lodgings, which is understandable as it is deep in normal residences. In Figure X, the old bathhouse/bathroom area in the upper right corner appears to be the deepest in the following preliminary situation.

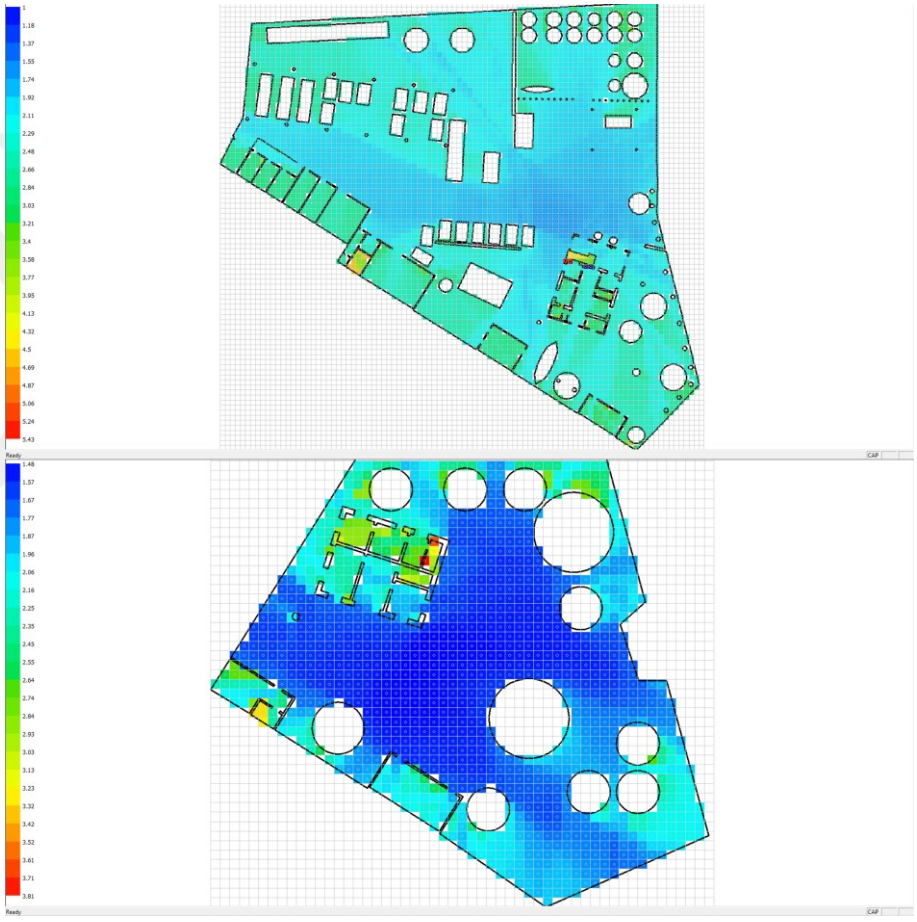


Figure 179: Mgf Farm, Existing & Preliminary Mean Depth Graph

In the current state of MGF Farm, all the warehouses on the left side have similar depth values. Apart from this, the deepest areas are the bathroom spaces in the existing and preliminary conditions.

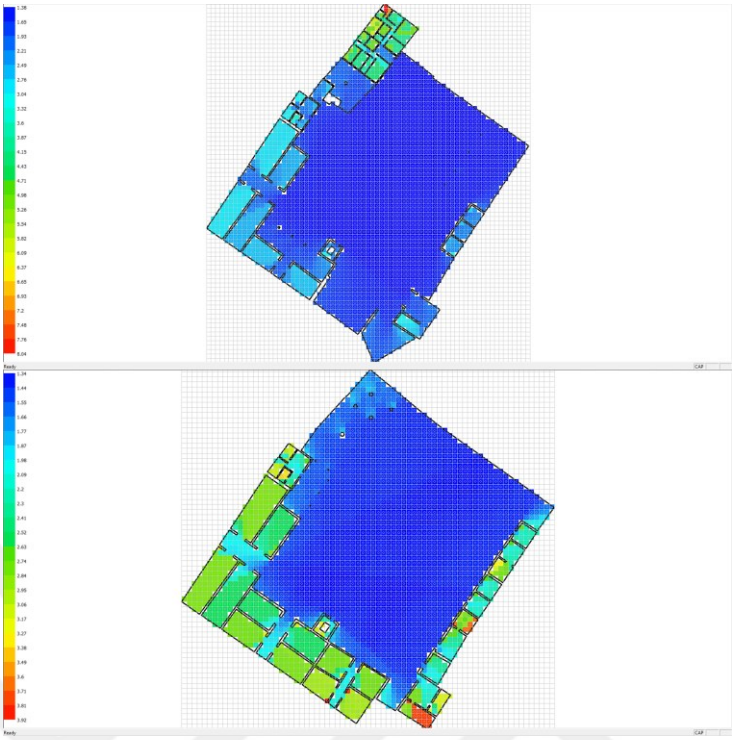


Figure 180: Özgiray Farm, Existing & Preliminary Mean Depth Graph

In the existing state of Özgiray Farm, we do not come across a very deep space among the main areas; only the toilet of the housing section appears in the graph above (Figure 180). In the preliminary stage, the pantry of the courtyard kitchen is the deepest space.

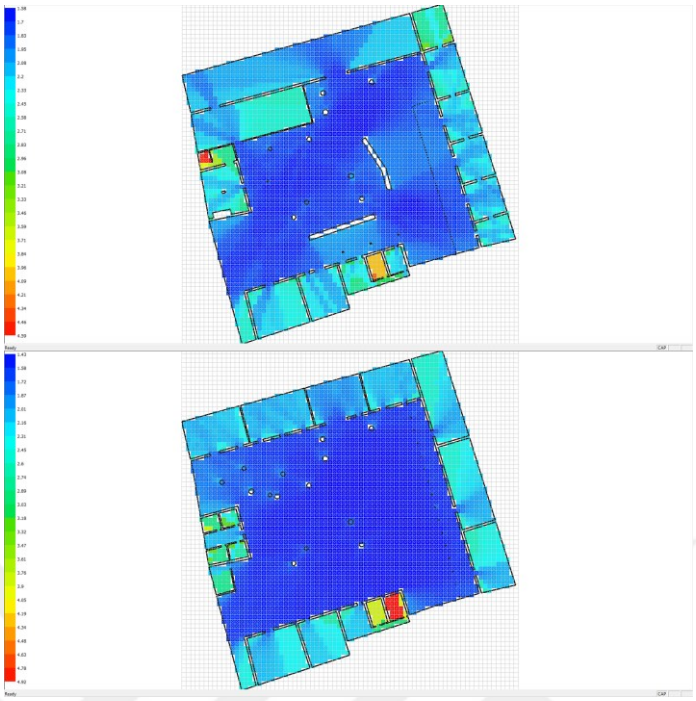


Figure 181: Yolaçan Farm, Existing & Preliminary Mean Depth Graph

In the existing state of the Yolacan farm, the deepest space is the farmhouse toilet, which appears red (Figure 181), and another deep space is the pesticide storage, seen as green in the top right corner (Figure 181). In the preliminary state, we see that the deepest space is the residence's bathroom.

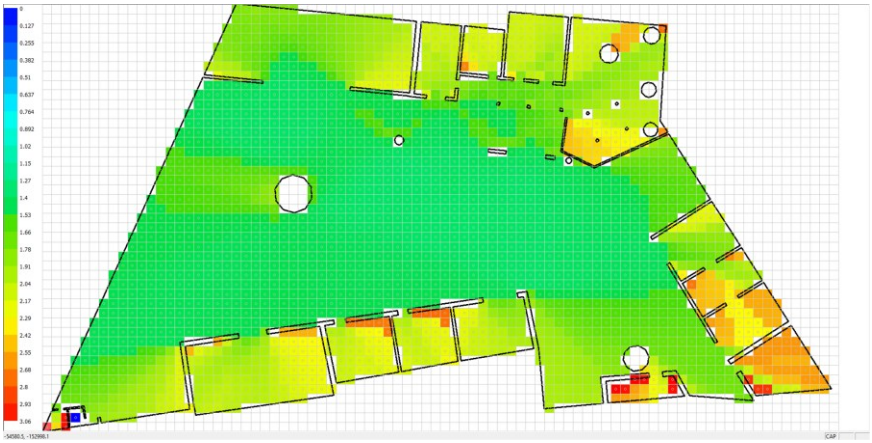


Figure 182: Çaylaklar Farm, Existing Mean Depth Graph

At the bottom right entrance of the Rookie Farm, there are areas designated as coops and stables, but these areas are not considered to be deep. The toilet in the far left corner and the storage area in the middle bottom are seen as the deepest spaces.

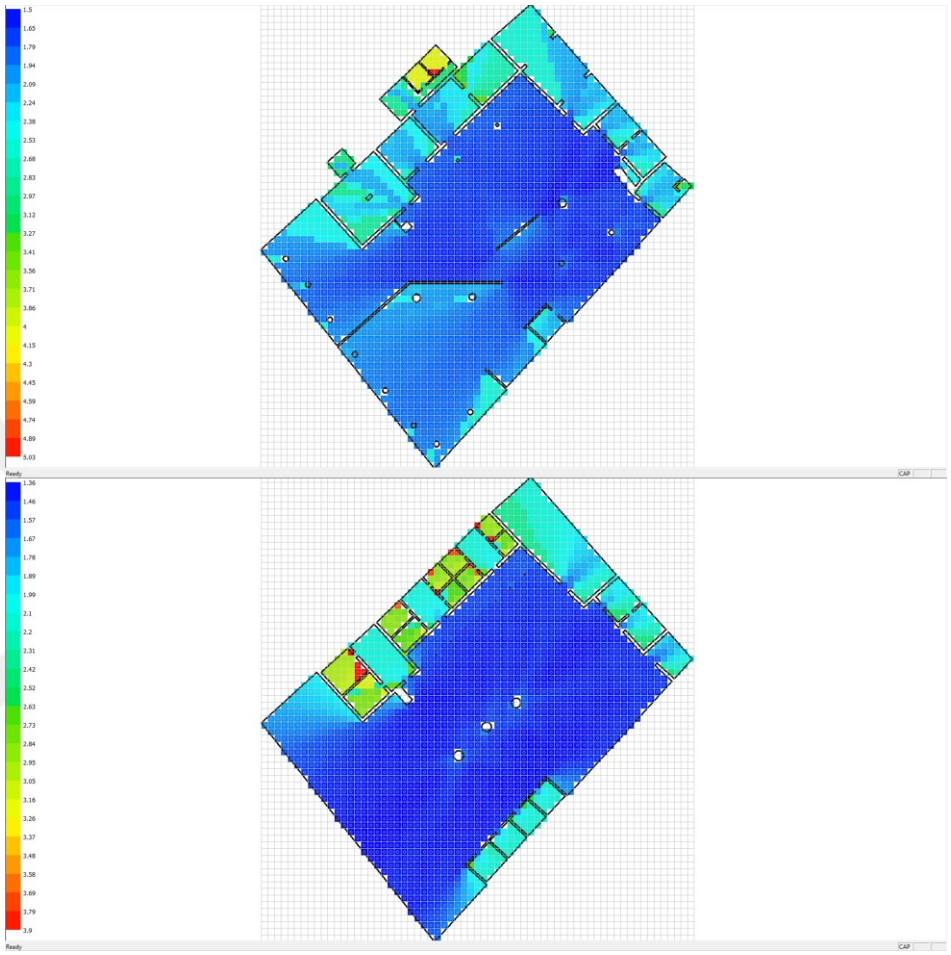


Figure 183: Gürani Farm, Existing & Preliminary Mean Depth Graph

In the current state of Gürani farm, we see that the office is the deepest place on the farm. In the preliminary state, however, it is seen as the farmhouse's and lodges' bathrooms.

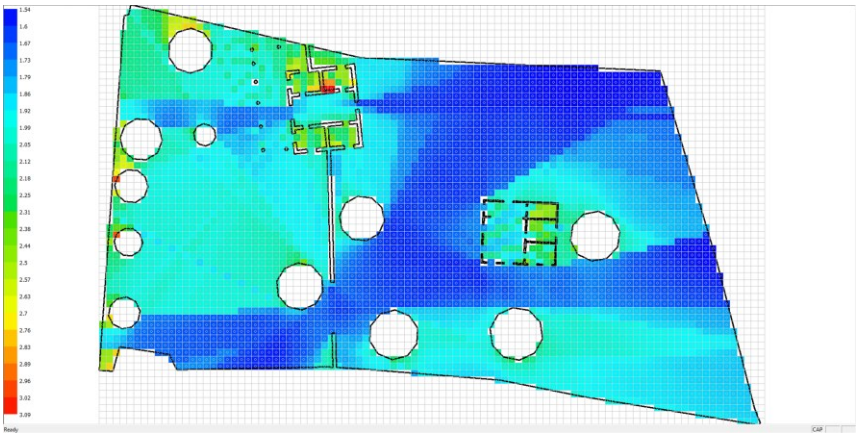


Figure 184: Sarıköşk Farm, Existing Mean Depth Graph

Since Sarıköşk farm is not actively used, one of the rooms of the farmhouse appears as deep space, but the fact that the farmhouse courtyard on the left side is deeper than the lodge courtyard on the right side as an open blue area is an important design parameter in terms of making a distinction between private life and work.

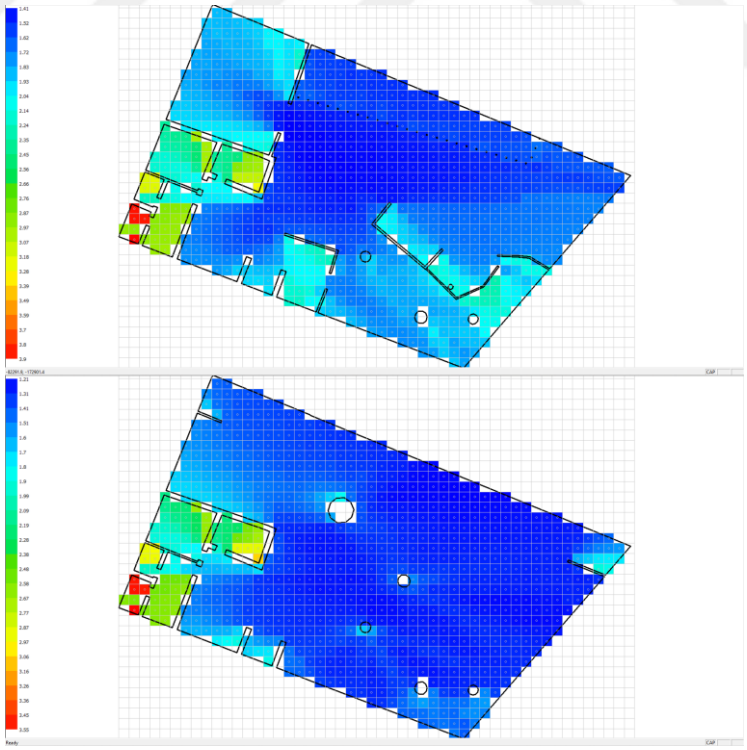


Figure 185: Eskiteke Farm, Existing & Preliminary Mean Depth Graph

Regardless of the condition of the old Teke farm, the lodge bathroom remains the deepest space. Apart from that, the open courtyard kitchen in front of the house seems to have deepened today due to being the only social area in the courtyard in the existing condition.

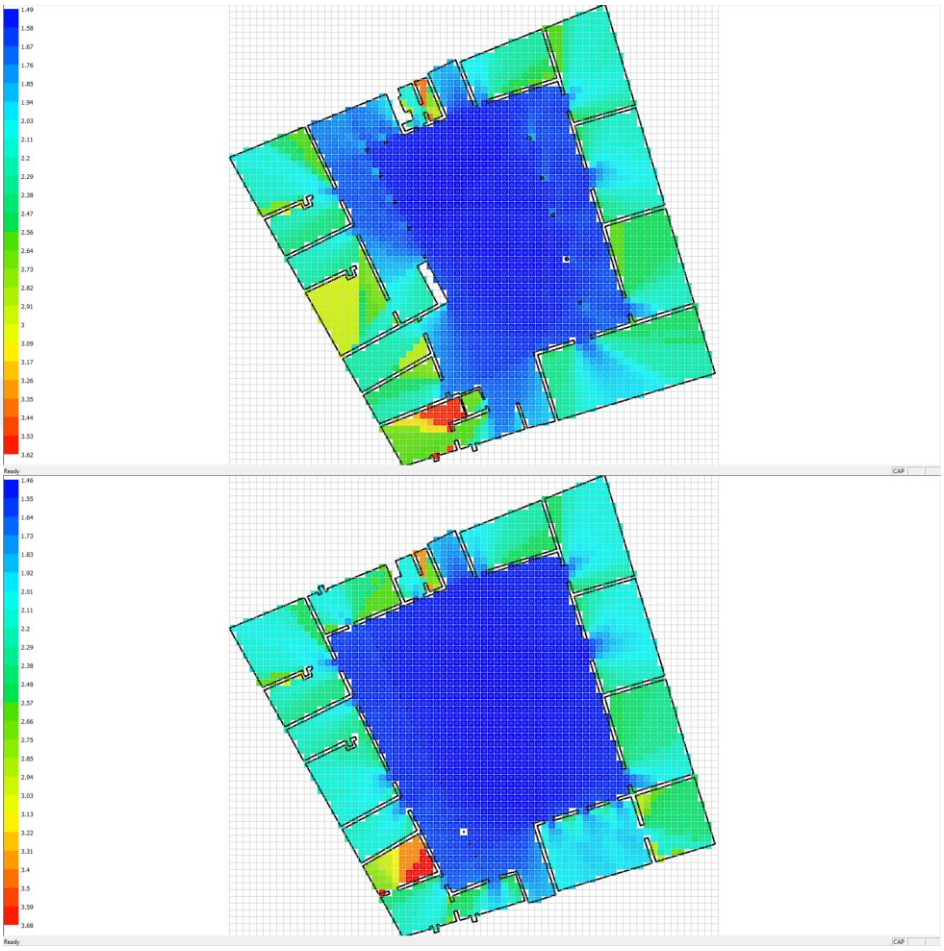


Figure 186: Batakçı Kerim Farm, Existing & Preliminary Mean Depth Graph

At Batakci Kerim's farm, while the courtyard kitchen pantry was the deepest space in the preliminary condition, in the existing condition, the same space appears to be the deepest, but it is a non-functional space.

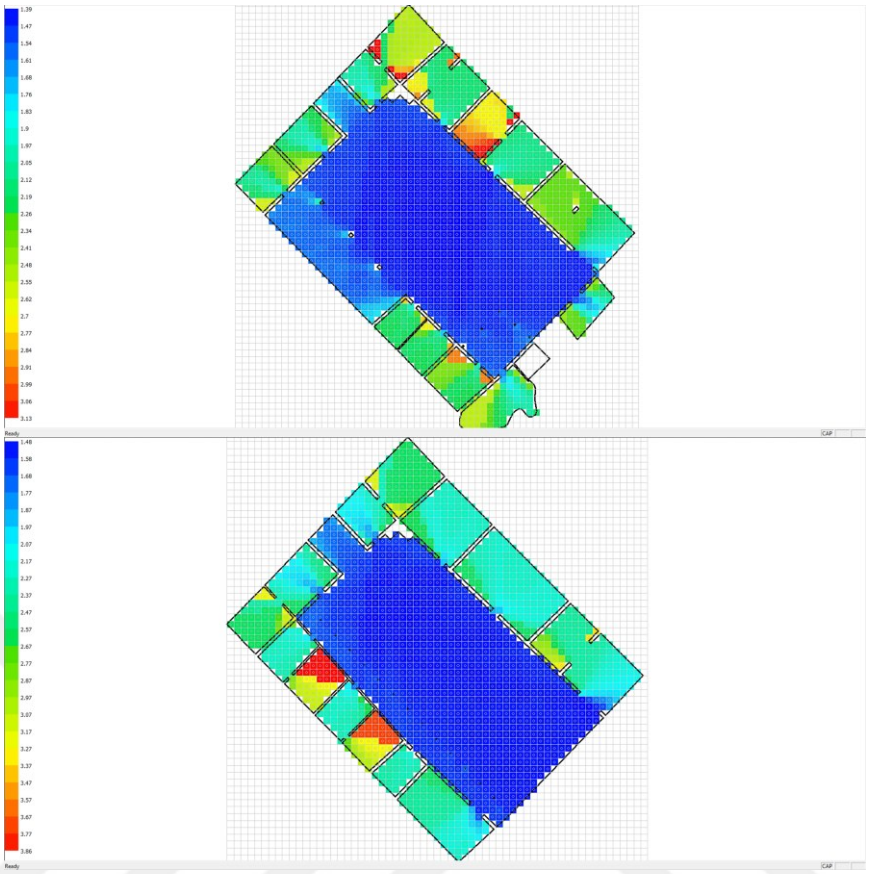


Figure 187: Kozacılar Farm, Existing & Preliminary Mean Depth Graph

One of the areas marked red in the current state of Kozacilar Farm is already used as a fertilizer storage, and the other as a pesticide storage. The fact that there is also a room for entering the rooms explains why these places are intentionally deeper. In the preliminary stage, the bedrooms of the old dormitories appear as the deepest location.

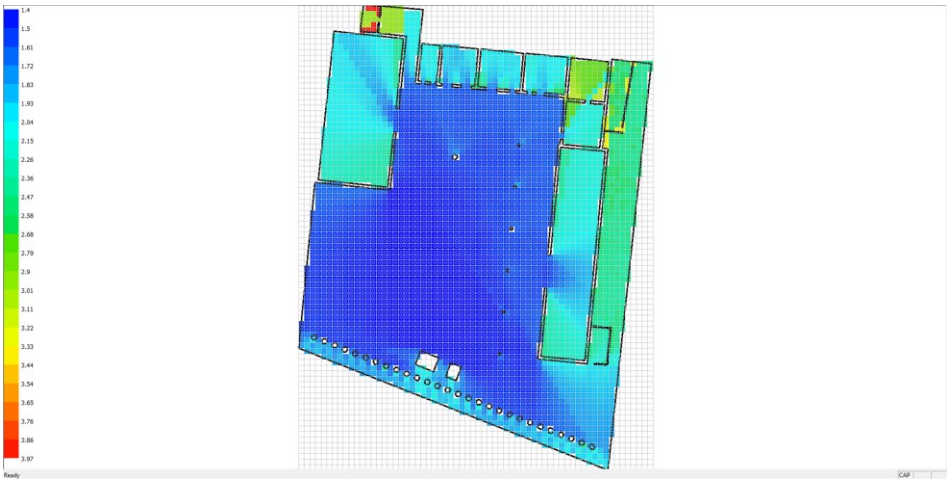


Figure 188: Karmutoğulları Farm, Existing Mean Depth Graph

The deepest place seen in red belongs to the courtyard toilet at Karmutogullari. The green area in the left corner is the farm owners' private workshop, the second deepest place.

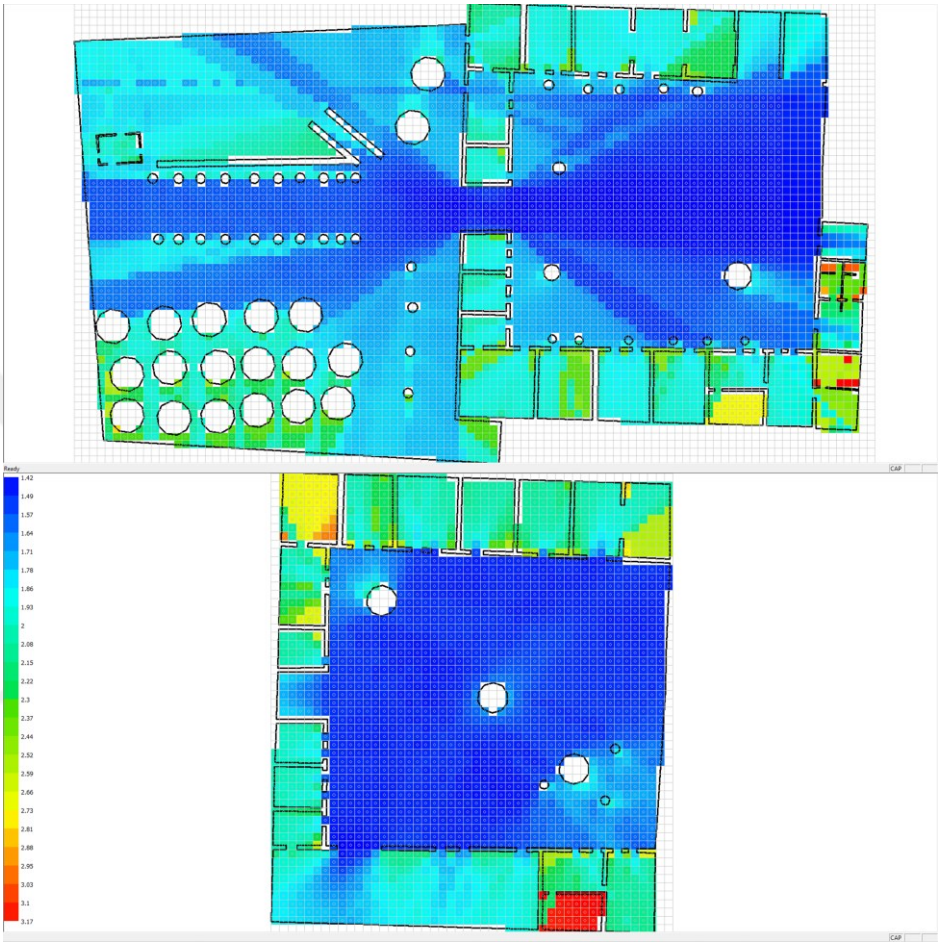


Figure 189: Ovadan Farm, Existing & Preliminary Mean Depth Graph

Currently, the deepest areas of Ovadan Farm are seen as various lodgings rooms. Another space is one of the rooms attached to the small agricultural tools in the workshop located on the upper right. In the preliminary stage, the cellar of the courtyard kitchen and one of the lodging rooms appear as the deepest area.

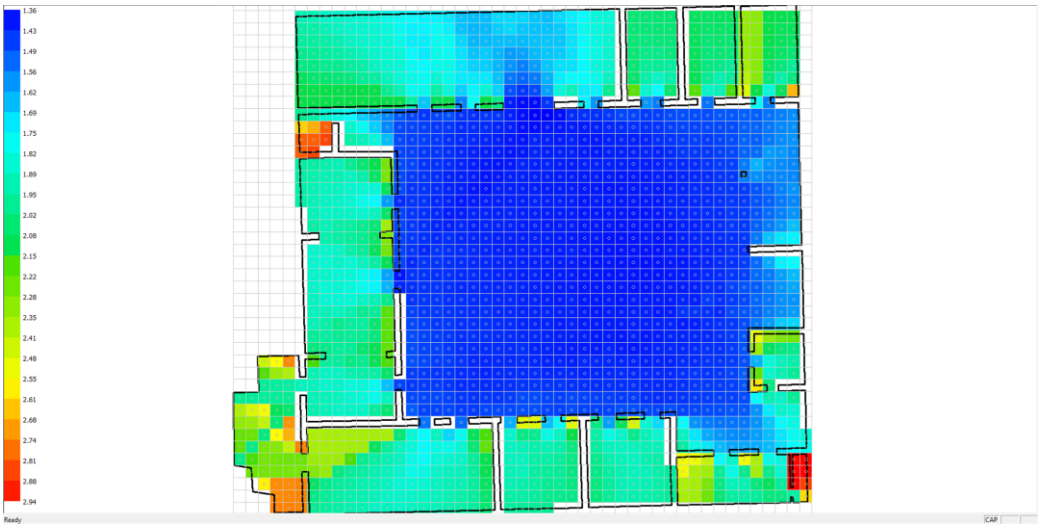


Figure 190: Historical Huzurkent Farm, Existing Mean Depth Graph

At the Historical Huzurkent Farm, while the courtyard toilet located in the top left orange area is one of the deep areas, the deepest area is the toilet of the residence.

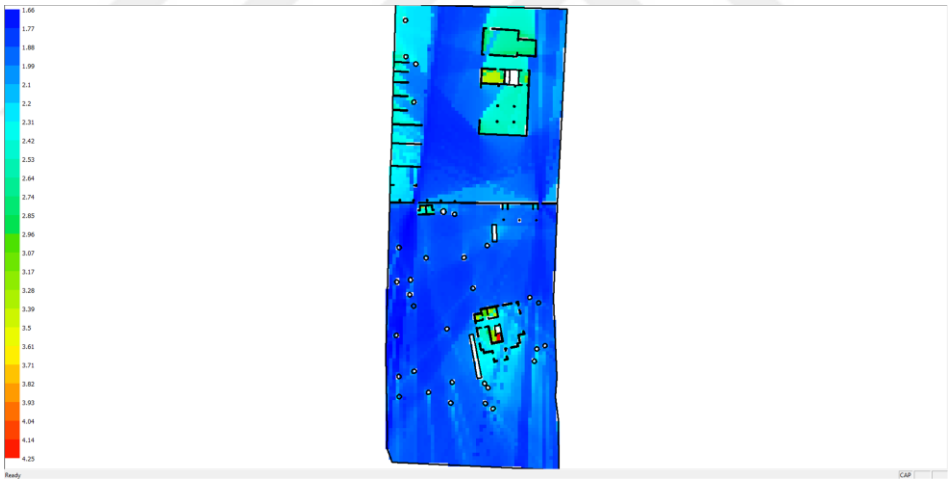


Figure 191: Kubilay Farm, Existing Mean Depth Graph

At Kubilay Farm, the red area below is an undefined space as the stairwell gap. In addition, the yellow area above is the second deepest area of the farm staff office.

As a result, even when reading visual graphics one by one, very deep spaces do not appear in farms. The main spaces that emerge are medicine storage, offices, and restrooms. Restrooms are generally the deepest spaces, while offices and medicine storages require explanation. Since offices are a region where paperwork related to the farm is done, valuable documents are stored, and even safes can be found, it is understandable that they are the deepest area for security reasons.

Although medicine storages are generally close to the farm entrances, they are among the deepest spaces since loading and unloading goods are frequently done in these areas. Additionally, since these medicine storages are always locked, their being deep spaces for controlled entry and exit is understandable.

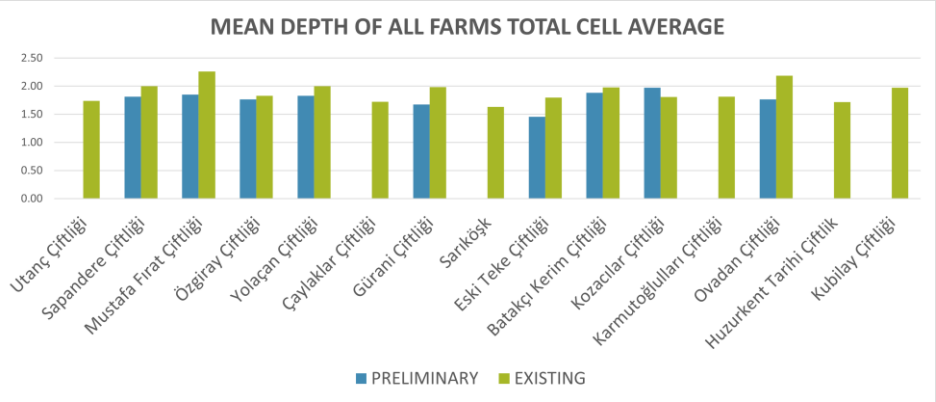


Figure 192: Mean Depth of All Farms Total Cell Average, Bar Graph

Looking at the average of all cells of the farms in the figure above (Figure 192), we can see that all farms except for Kozacilar have deepened. In Kozacilar Farm, the depth is reduced due to the direct inclusion of an area that used to have two lodgings into the yard. Apart from that, we can see that the averages of all farms with existing and preliminary plans are deeper. As a primary interpretation, the depth value has increased despite most lodgings being converted into storage or parking lots today. That is because, besides the lodgings that have become more open-planned at present, the addition of various social areas and landscape elements that have been divided into more sections in many existing areas has led to the emergence of deeper spaces on average. However, according to the previous connectivity analysis results, the deepening of spaces does not affect the accessibility or reduce the connectivity values of the spaces. We can say that more connected yet deeper spaces are formed in today's farms.

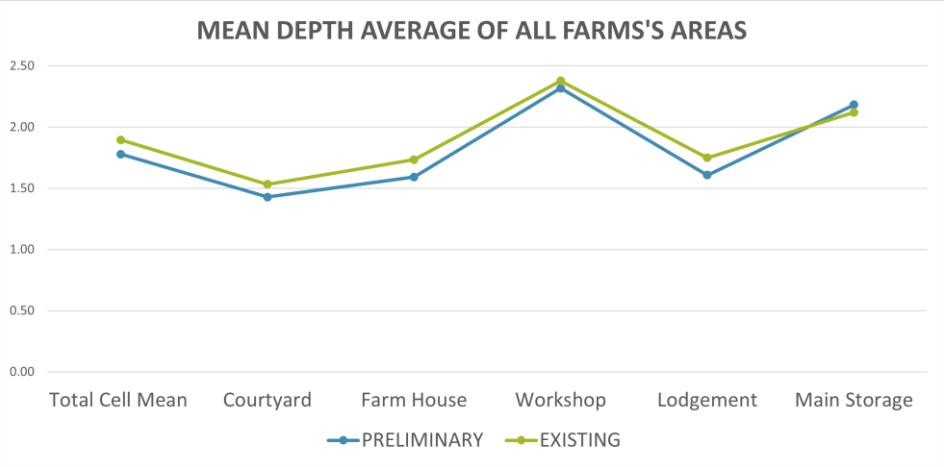


Figure 193: All Farms' Areas Averages of Mean Depth, Line Graph

Finally, in the graph above (Figure 193), all areas except the main storage area are deeper nowadays. The biggest reason for this is that there is a circulation in which goods are loaded and unloaded frequently in storage areas today, so storage areas on farms have had to become shallower.

5.3.3. Integration

Integration parameters will numerically express how connected farm areas are to all other areas. Comments and discussions will be made about the interaction between different areas within the farm, the hierarchy between functions, and the frequency of use of this connectivity. Farms are proportionally analyzed with connectivity analysis. An integration table was prepared according to the categorization table (Table 13) prepared in the connectivity section, and the connectivity ranking was placed according to the colours of the categorization on one side. It was concluded that the integration ranking of areas is the same as the connectivity ranking. Therefore, it is possible to directly correlate farm operating models and user status according to area integration and connectivity rankings. From this table, we understand that all farms match the connectivity categorization.

Table 13: Integration and Connectivity Categorization Comparison Table

Case	Integration	Integration2	Integration3	Integration4	Integration5	Integration Rank	Connectivity Rank	Match
	Courtyard	Farm House	Workshop	Lodgement	Main Storage			
Utanç Çiftliği	7000584.835	5034181.969	69824.2348	6031847.244	693668.2307	Courtyard > Lodgement > Farm House > Main Storage > Workshop	Courtyard > Lodgement > Farm House > Main Storage > Workshop	1
Sapandere Çiftliği	5913873.187	4898799.71	179815.2085	4712127.444	129320.5029	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	1
Mustafa Fırat Çiftli	3355977.265	3309195.932	872827.2683	1853652.8	1085139.301	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	1
Özgiray Çiftliği	6184124.842	5156809.394	58777.2818	5906308.926	97235.7433	Courtyard > Lodgement > Farm House > Main Storage > Workshop	Courtyard > Lodgement > Farm House > Main Storage > Workshop	1
Yolaçan Çiftliği	3243300.138	2891782.408	541258.0335	1467858.98	918402.47	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	1
Çaylaklar Çiftliği	3465749.775		751453.1553	1890821.722	2166966.112	Courtyard > Main Storage > Lodgement ≥ Workshop	Courtyard > Main Storage > Lodgement ≥ Workshop	1
Gürani Çiftliği	1606106.525	1016816.456	256203.0737	1324494.931	149410.8449	Courtyard > Lodgement > Farm House > Workshop > Main Storage	Courtyard > Lodgement > Farm House > Workshop > Main Storage	1
Sarıköşk	7283558.427	3149028.217	335779.3133	4603383.288	1181475.42	Courtyard > Lodgement > Farm House > Main Storage > Workshop	Courtyard > Lodgement > Farm House > Main Storage > Workshop	1
Eski Teke Çiftliği	646268.7719		154628.4909	348012.6388	247175.1686	Courtyard > Lodgement > Main Storage > Workshop	Courtyard > Lodgement > Main Storage ≥ Workshop	1
Batakçı Kerim Çiftl	3208818.751	2994413.246	127182.1371	2387061.341	1256283.301	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	1
Kozacılar Çiftliği	2244478.749		300681.766	2154955.198	136821.594	Courtyard > Lodgement> Workshop ≥ Main Storage	Courtyard > Lodgement> Workshop ≥ Main Storage	1
Karmutoğulları Çif	7874364.268		1094445.314	6342772.133	1659845.767	Courtyard > Lodgement > Main Storage ≥ Workshop	Courtyard > Lodgement > Main Storage ≥ Workshop	1
Ovadan Çiftliği	16728086.87	2979584.953	814396.2968	3446568.292	9337405.284	Courtyard > Lodgement > Farm House > Workshop > Main Storage	Courtyard > Lodgement > Farm House > Workshop > Main Storage	1
Huzurkent Tarihi Ç	1676104.873		146794.4662	1130587.24	933540.6222	Courtyard > Lodgement > Main Storage > Workshop	Courtyard > Lodgement > Main Storage ≥ Workshop	1
Kubilay Çiftliği	8100254.579	5062593.3	50826.8239	4295388.676	2355427.105	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop	1
							MATCH COUNT=	15

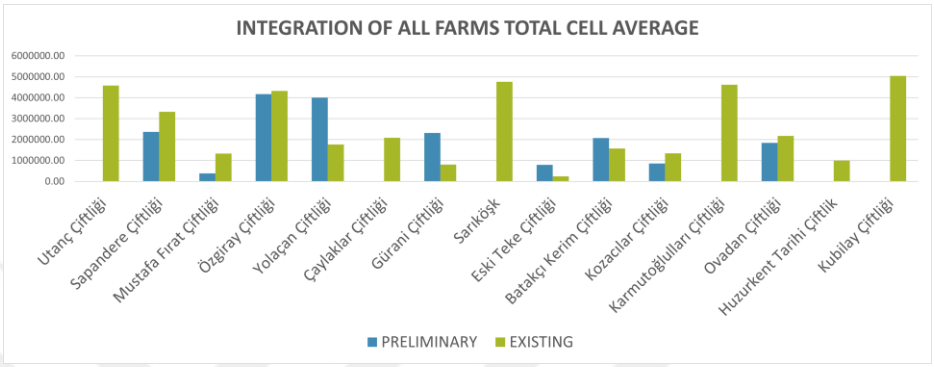


Figure 194: Integration of All Farms Total Cell Average, Bar Graph

Only the average cell data graph above matches except for Ovadan Çiftliği. While Ovadan Çiftliği shows a higher integration value in its existing state, it shows a lower connectivity value. That is because there is a significant increase in the surface area of Ovadan Çiftliği, so calculations are not made on the same amount of grid and larger gaps in the newly added areas, resulting in an expected situation of showing a more integrated value.

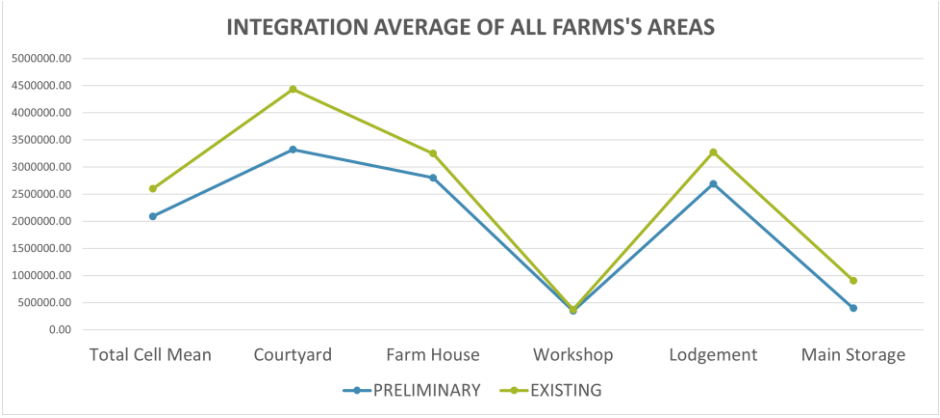


Figure 195: All Farms' Areas Averages of Integration, Line Graph

As a result, farms nowadays provide much higher integration values than their old versions. Farms are becoming more integrated as they gain new agricultural spaces and lose accommodation spaces. Because the decrease in the number of employees makes it easier to create

more integrated areas with fewer people. Therefore, when farm structures are transformed from simple farmhouses into more complex housing units, farms become more integrated into today's Cukurova.

5.3.4. Graph Data Results

Graph data analysis has been conducted in this section regarding the preliminary and existing states of farms. The parameters used in this analysis are connectivity, mean depth, and integration. While discussing the relationships between the most viewed areas of the farms with integration and connectivity parameters, the deepest areas within the farms are determined, and cause and effect relationships are discussed with the mean depth parameter.

According to the analysis results, it has been determined how the spatial hierarchy of farms in Cukurova is ranked based on the comparison of farm connectivity values. These connectivity values are in the connectivity section tables (Table 11 & Table 12).

Additionally, relationships between spaces on farms were analyzed, and the preliminary and existing plans of farms were compared. Although there was no change in the spatial hierarchy between the preliminary and existing situations, the integration and connectivity values increased due to changes in usage and the opening of additional areas. As a result, while a shallower spatial depth was expected, the mean depth value increased because the number of new spaces increased, and they were subdivided into many sections. Specifically, in Turkey, adding special storage areas and farm toilets due to Good Agricultural Practices (İyi Tarım Uygulaması) has created many deepening effects on the preliminary situations.

Furthermore, it has been identified that certain qualitative inquiries must be addressed to comprehend the crucial aspects of the graph data and significant disparities among farms. These inquiries can be classified into the operating model and the farm owner's accommodation. Without this pertinent information, the comprehension, analysis, and even the design of a farm's layout configuration may be hindered, rendering the conducted studies superficial.

These analysis results can provide important information to farm owners when determining the hierarchy of spaces on their farms, organizing work, and using spaces. In particular, attention should be paid to whether a space is a farmhouse and the relationship between the workshop and main storage. Nevertheless, the values of the farmhouse and residential areas are determined by their respective entrances, making their locations crucial. Interior designs, however, are not encompassed within the scope of the study, as they lack similarities or shared characteristics. Housing designs differ significantly based on individual needs and are considered separately from the farmhouse design system.

Furthermore, considering the changes in usage on farms, it may be necessary to rearrange the locations based on the functions of the spaces. The results of this analysis can provide an important foundation for decisions to improve farm productivity.

The analyses presented in this section provide a comprehensive perspective on farms' before and after conditions. That is because it has been observed that old farms create various constraints or disconnected spaces while adapting to modern agriculture. Designing the spatial hierarchy based on user and business data can create more informed decisions.

As a result, graph data analysis is an important tool for understanding the organization of farms and user frequencies, providing farm owners and architects with a comprehensive view. These analyses can be used to compare preliminary and existing farm situations and to rearrange the functions and locations of spaces within farms.

5.4. Radial Data Analysis

In this section, the selected radial parameters of both the preliminary and existing conditions of farms will be examined. These parameters are radial mean and radial variance. The average of the linear rays emitted from the selected areas in the farms with radial mean will be discussed regarding their effect on the dimensional differentiation in spaces as perceived by the human eye. In other words, a comparison will be made between the varying visual depths of spaces experienced by farm users. With the radial variance, the extent to which the rays emitted from

selected points differ from each other is reached. With this value, similarities and differences between the previous and current conditions, especially in terms of spaces, will be discussed. Spaces with a low variance value will be evaluated as those closest to circular spaces, while spaces with a high variance value can be considered more complex or spaces with a significant variation in visual depth. Spaces with a high variance value can lead us to conclude that the depth of the space is multifaceted and that the connections within it have increased, allowing us to make various interpretations, such as the space being divided into more sections, each with different depth values.

As a result, the obtained numerical radial values will be visualized using various histograms and graphs to make them easier to read. Thus, the relationships between radial values and farms can be analyzed. Graphs created from the average radial values of farms will be used to discuss the morphological differences in farms from the user's perspective in Cukurova and the direction and reasons for these changes. While interpreting these values, it will also be examined which spatial and user-focused qualitative data of the farms should be considered.

Table 14: All Existing Radial Data's Values

CASE	Radial Mean	Radial Mean	Radial Mean	Radial Mean	Radial Mean	Radial Mean
EXISTING	Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği	1572.313902	2394.5142	1245.6701	456.8162	1829.2386	776.084
Sapandere Çiftliği	1436.970942	2321.9605	1285.5737	433.7134	1416.793	562.7338
Mustafa Fırat Çiftliği	958.6511756	1920.7859	1496.3753	867.3979	941.2335	887.3172
Özgiray Çiftliği	1583.270212	2535.2663	1462.332	377.4596	1532.6052	423.0704
Yolaçan Çiftliği	1128.858115	1847.6732	1456.6238	756.177	1021.5138	1013.1523
Çaylaklar Çiftliği	1200.98645	1969.3663		823.603	1054.37	1329.9776
Gürani Çiftliği	984.3821158	1447.0624	1006.7286	518.4568	1149.847	623.4818
Sarıköşk	1618.865998	2185.7852	1340.5584	349.4246	1657.8142	604.0465
Eski Teke Çiftliği	755.9983054	1194.9261	944.5684	312.6582	615.3751	810.744
Batakçı Kerim Çiftliği	1092.346979	2059.6214	1493.3801	465.9798	1414.2504	1049.8901
Kozacılar Çiftliği	1076.162842	1848.91		525.9158	1182.1123	592.3804
Karmutoğulları Çiftliği	1506.275237	2582.9736		575.6994	1651.8788	1037.7237
Ovadan Çiftliği	1128.004662	2249.1097	1030.8843	790.0907	1283.5962	644.0652
Huzurkent Tarihi Çiftlik	1016.961215	1742.0551		403.7981	841.8031	1039.8635
Kubilay Çiftliği	1615.530823	2292.672	1538.4182	303.0883	1419.1965	1197.9276
COUNT	**15**	**15**	**11**	**15**	**15**	**15**
AVERAGE	**1245.04**	**2039.51**	**1300.10**	**530.69**	**1267.44**	**839.50**
CASE	**Radial Variance**	**Radial Variance**	**Radial Variance**	**Radial Variance**	**Radial Variance**	**Radial Variance**
EXISTING	**Total Cell Mean**	**Courtyard**	**Farm House**	**Workshop**	**Lodgement**	**Main Storage**
Utanç Çiftliği	1671861.997	1057655.297	3117031.106	30261.2061	2204080.442	478968.9649
Sapandere Çiftliği	1321558.033	820099.8246	3311082.61	75874.5024	2923219.336	50113.0072
Mustafa Fırat Çiftliği	808264.4202	749508.491	2134209.944	709041.124	1652654.464	815931.7367
Özgiray Çiftliği	1525492.68	249916.2179	3258064.363	59826.1432	3911783.215	127042.4998
Yolaçan Çiftliği	1003372.817	789890.3125	1708475.225	356586.7976	1129758.743	626067.7625
Çaylaklar Çiftliği	1115387.45	768189.4312		519624.6705	1505714.315	1273252.219
Gürani Çiftliği	682507.3072	677363.1094	1091880.673	292458.4522	2103425.537	116896.0023
Sarıköşk	1774865.699	2199433.266	1930404.106	237150.0807	1739046.288	806438.6319
Eski Teke Çiftliği	396074.9582	415987.7208	516049.0767	27502.1331	484368.2845	451987.9373
Batakçı Kerim Çiftliği	836814.3853	333253.203	2037538.449	96657.2857	1492710.358	943848.7972
Kozacılar Çiftliği	750390.4889	247587.0789		369925.052	2020844.722	68944.1484
Karmutoğulları Çiftliği	1562414.371	444520.9417		722200.3546	3014851.668	844877.9388
Ovadan Çiftliği	1045857.189	761567.4593	2253789.662	537854.753	2301330.411	445523.0558
Huzurkent Tarihi Çiftlik	663291.9302	121799.5137		195176.7127	1345183.495	835396.7984
Kubilay Çiftliği	1738307.082	1824360.402	1994688.468	15356.6703	1941055.372	1082242.494
COUNT	**15**	**15**	**11**	**15**	**15**	**15**
AVERAGE	**1126430.721**	**764075.4846**	**2123019.426**	**283033.0625**	**1984668.443**	**597835.4663**

Table 15: All Preliminary Radial Data's Values

CASE	Radial Mean	Radial Mean	Radial Mean	Radial Mean	Radial Mean	Radial Mean
PRELIMINARY	Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği						
Sapandere Çiftliği	1288.88	2239.56	1132.52	429.76	464.51	581.34
Mustafa Fırat Çiftliği	797.38	1383.04	1021.37	231.28	850.85	398.35
Özgiray Çiftliği	1521.72	2429.64	1693.67	332.93	1827.59	429.20
Yolaçan Çiftliği	1425.16	2427.09	1752.52	849.85	1857.79	631.63
Çaylaklar Çiftliği						
Gürani Çiftliği	1317.35	1782.21	1247.05	511.16	1293.61	644.81
Sarıköşk						
Eski Teke Çiftliği	1033.24	1388.43	688.56	234.77	727.11	312.66
Batakçı Kerim Çiftliği	1172.42	2155.38	1583.66	492.12	1714.84	1012.70
Kozacılar Çiftliği	970.74	1690.62	1037.89	620.84	1222.91	704.29
Karmutoğlulları Çiftliği						
Ovadan Çiftliği	1194.74	1921.44	1034.50	562.42	1156.76	992.18
Huzurkent Tarihi Çiftlik						
Kubilay Çiftliği						
COUNT	9	9	9	9	9	9
AVERAGE	1191.29	1935.27	1243.53	473.90	1235.11	634.13
CASE	Radial Variance	Radial Variance	Radial Variance	Radial Variance	Radial Variance	Radial Variance
PRELIMINARY	Total Cell Mean	Courtyard	Farm House	Workshop	Lodgement	Main Storage
Utanç Çiftliği						
Sapandere Çiftliği	1125167.93	404418.24	2958836.17	618848.89	595893.81	327372.78
Mustafa Fırat Çiftliği	494478.00	349562.87	651335.56	53973.03	794084.96	163740.35
Özgiray Çiftliği	1325346.18	145505.62	2506035.29	22337.35	2616667.77	110312.31
Yolaçan Çiftliği	1399213.47	727739.72	2499593.38	912326.37	3071378.04	76506.42
Çaylaklar Çiftliği						
Gürani Çiftliği	1100986.25	2566378.70	1763787.05	513908.47	2134821.20	124446.67
Sarıköşk						
Eski Teke Çiftliği	646292.63	285207.86	603394.47	7498.30	853187.16	27502.13
Batakçı Kerim Çiftliği	905937.79	304104.96	2190620.28	31444.71	1666989.14	1071798.66
Kozacılar Çiftliği	623494.46	261403.08	1831432.12	667587.62	1364946.59	203070.27
Karmutoğlulları Çiftliği						
Ovadan Çiftliği	959748.62	632152.30	2091430.74	505098.80	1819247.03	559555.47
Huzurkent Tarihi Çiftlik						
Kubilay Çiftliği						

5.4.1. Radial Mean

With the Radial Mean parameter, the average depth of field of the areas used in farms and the width of the visible area from the human eye can be examined, and these conditions can be discussed within their context. In other words, by looking at whether the selected spaces in the working scope of the spaces have a field of view at what depth in the farms, the priority status or controllability of the spaces in the system can be analyzed.

In this section, a general radial mean ranking will be made by looking at the bar graph created from the selected spaces in the existing conditions of the farms. Finally, the depth changes in the past and present will be examined through graphs created with the average values of the farms.

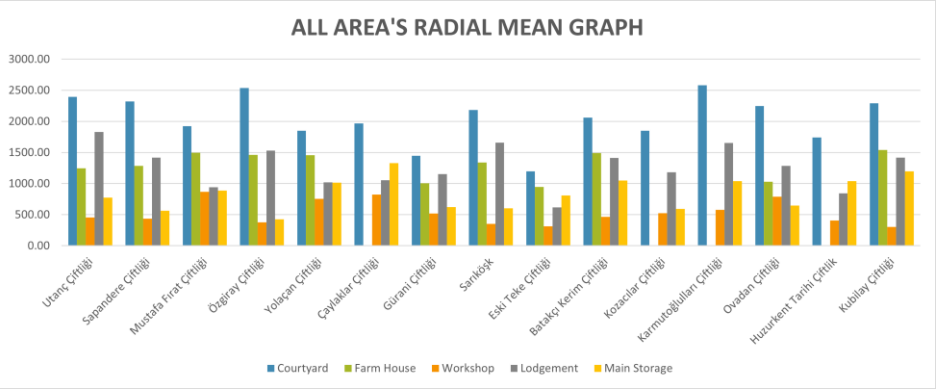


Figure 196: All Farms' Areas Radial Mean, Bar Graph

Table 16: Radial Mean Ranking

Case	Radial Mean Courtyard	Radial Mean Farm House	Radial Mean Workshop	Radial Mean Lodgement	Radial Mean Main Storage	Mean Radial Rank
Utanç Çiftliği	2394.51	1245.67	456.82	1829.24	776.08	Courtyard > Lodgement > Farm House > Main Storage > Workshop
Sapandere Çiftliği	2321.96	1285.57	433.71	1416.79	562.73	Courtyard > Lodgement > Farm House > Main Storage > Workshop
Mustafa Fırat Çiftli	1920.79	1496.38	867.40	941.23	887.32	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop
Özgiray Çiftliği	2535.27	1462.33	377.46	1532.61	423.07	Courtyard > Lodgement > Farm House > Main Storage > Workshop
Yolaçan Çiftliği	1847.67	1456.62	756.18	1021.51	1013.15	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop
Çaylaklar Çiftliği	1969.37		823.60	1054.37	1329.98	Courtyard > Main Storage > Lodgement ≥ Workshop
Gürani Çiftliği	1447.06	1006.73	518.46	1149.85	623.48	Courtyard > Lodgement > Farm House > Main Storage > Workshop
Sarıköşk	2185.79	1340.56	349.42	1657.81	604.05	Courtyard > Lodgement > Farm House > Main Storage > Workshop
Eski Teke Çiftliği	1194.93		312.66	944.57	810.74	Courtyard > Lodgement > Main Storage > Workshop
Batakçı Kerim Çiftl	2059.62	1493.38	465.98	1414.25	1049.89	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop
Kozacılar Çiftliği	1848.91		525.92	1182.11	592.38	Courtyard > Lodgement > Main Storage ≥ Workshop
Karmutoğulları Çif	2582.97		575.70	1651.88	1037.72	Courtyard > Lodgement > Main Storage ≥ Workshop
Ovadan Çiftliği	2249.11	1030.88	644.07	1283.60	790.09	Courtyard > Lodgement > Farm House > Main Storage > Workshop
Huzurkent Tarihi Ç	1742.06		403.80	841.80	1039.86	Courtyard > Main Storage > Lodgement ≥ Workshop
Kubilay Çiftliği	2292.67	1538.42	303.09	1419.20	1197.93	Courtyard ≥ Farm House > Lodgement > Main Storage > Workshop

The following ranking table has been created based on the bar graph above (Figure 196). However, it is like the table (Table 16) made for the connectivity analysis; all the rankings in the blue category have moved to the orange category. That is because the integration and connectivity values of the workshop area do not show similarity with the mean radial rankings due to the large storage areas. Workshops provide less depth of view due to hosting fewer people and offering limited perspectives depending on the occupancy.

Looking from another perspective, especially at the rankings of the farmhouse and lodgement, there are significant differences between these places depending on whether the farm operator is also the farm owner. If the farm owner also lives on the farm, they have the deepest perspectives in the farmhouse. In this way, the farm owner, the farmhouse, has visual dominance over entries, exits, internal work tracking, and even the house.

We can use farm users' security and job responsibility as a basis for our inference instead of discussing the graph and isovist values. According to table (Table 16), the farm owners live in

the green ones, while in others, there is either no farmhouse or the farm owners do not permanently reside. This situation proves to be directly related to the lodgement and farmhouse locations. However, when farm owners reside on the premises, it can be inferred that various landscape elements or spaces have been introduced in front of the farmhouse. This addition has resulted in a decrease in the current radial mean values. No additions obstruct the connection of farmhouse entries with courtyards, even if the farm owners always reside.

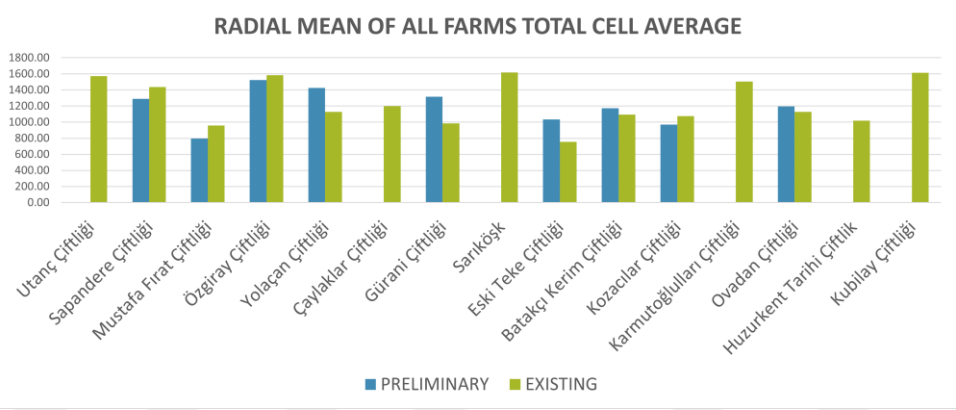


Figure 197: Radial Mean of All Farms Total Cell Average, Bar Graph

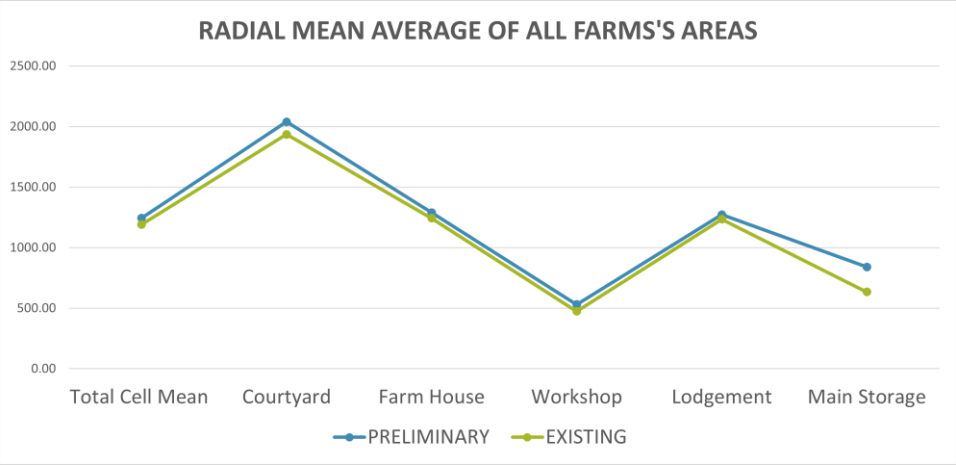


Figure 198: All Farms' Areas Averages of Radial Mean

Looking at the bar graph above (Figure 197), we can see that four farms have higher radial mean values today, but we can say that the difference is very small in Sapandere, MGF, Özgiray,

and Kozacılar farms, which means it did not affect the average. The line graph above (Figure 197) shows that the radial mean value has decreased compared to the total cell means in all areas.

Overall, many elements have been added that will affect the depth of view due to the agricultural needs of the farms and various open and closed spaces brought by modern life. These added elements are the biggest courtyard, farmhouse, and lodgement variable. The radial mean values for main Storage and workshop are lower because these areas, which were previously larger and in one piece, have been divided into various sections according to the materials used today. Especially in the past, grain and cotton-like products were stored in main storage areas, but now, due to gardening, large agricultural equipment, fertilizers, and pesticides are stored instead of products, leading to these divisions in storage areas.

5.4.2. Radial Variance

We can discuss the complexity of spaces in farms by using the radial variance value. The complexity of farms and spaces from past to present will be interpreted based on the increase and decrease of the value of differentiation of the rays from where the values are taken.

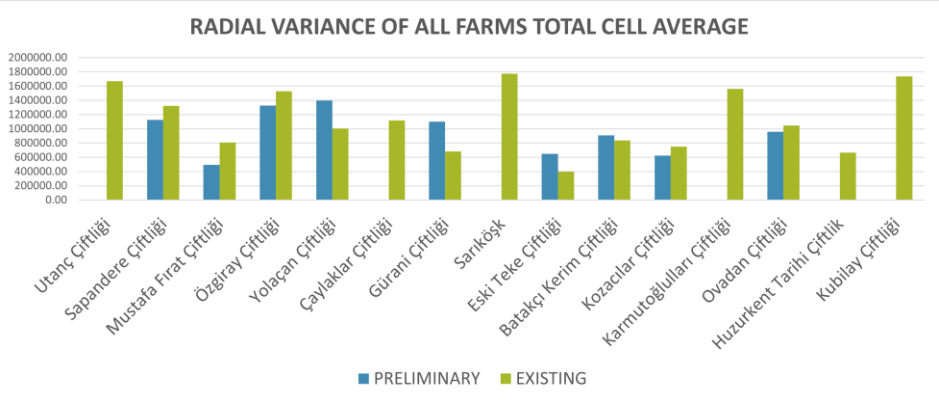


Figure 199: Radial Variance of All Farms Total Cell Average, Bar Graph

According to the table above (Figure 199), farms with preliminary and existing data will be analyzed. The Sapandere farm currently has a higher radial variance value. Its old barn and storage areas have more layers and new openings. A new housing area has been added to the

courtyard, and the old bathroom areas have been converted into storage areas. In addition, the newly added open barn area is one of the most important factors that increase the radial variance value.

If we consider MGF Farm an old venue, there is only a farmhouse in its original form with extensions added to its front and back. It has one of the largest yards among farms, and significant distance differences between spaces explain the high variance value in its existing state.

Most of the main areas of Ozgiray Farm are still in their old form. One of the old lodging areas and warehouses has been demolished and turned into open parking areas. The factor affecting the largest variance value is the new lodging area and the landscape in front of it, a significant change that will increase the variance value from almost every point in the yard.

At Yolacan Farm, the situation is slightly different because the variance value is lower in the existing plan. Although almost all spaces and the yard have differentiated, this differentiation has created circular and shrinking spaces, so the variance value has decreased significantly.

In Gürani Farm, like Yolacan Farm, although almost all spaces have differentiated, it can be said that the partitioning in the yard has created spaces that generate fewer variable rays.

At Eskiteke Farm, the yard, which was previously wider, has created circular gaps with extensions, separators, and landscape elements, which has reduced the variance value in today's situation.

Batakçı Kerim Farm also has a narrowing yard, and the variance value has decreased, especially due to the extensions made to the old lodging and kitchen areas and the decreasing variance.

At Kozacılar Farm, the surface area included in the yard has increased due to the demolished lodging areas turned into a park, which is an effect that increases the variance value.

Although Ovadan Farm's surface area has almost doubled, the increase in variance value is minimal because the added landscape area contained many distinguishing elements, which did not affect the increase in variance value as in Sapandere and MGF farms.

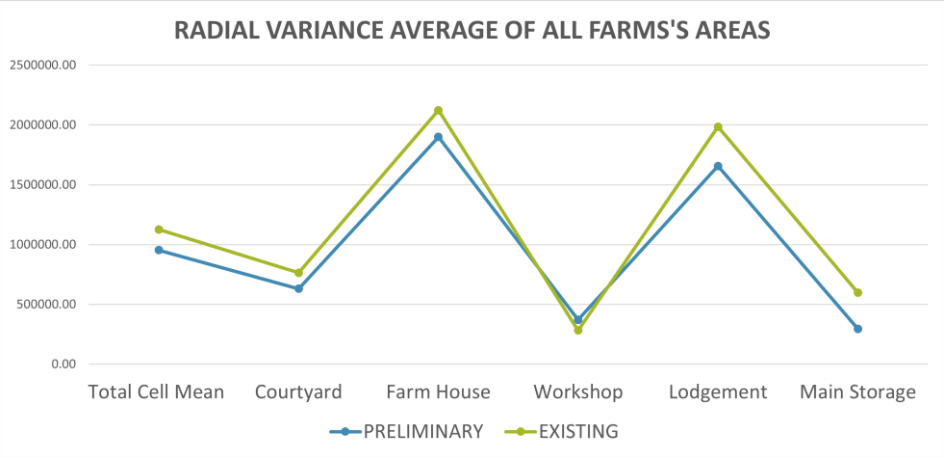


Figure 200: All Farms' Areas Averages of Radial Variance

If we look at all the spatial values, they show parallelism with the explanations above. Only the Workshop area has a lower variance value nowadays, and the reason for this is that, unlike storage areas, workshop areas have direct partitioning. It can be said that the aim is to facilitate the control and transportation of equipment, which has become increasingly numerous in small and enclosed spaces.

Generally, it was expected that the variance value would not be higher nowadays in this section, and according to the line graph above (Figure 200), the average seems to be in this direction. However, contrary to expectations, five farms have lower variance values in existing plans. That is because all the farms in the scope of the study have internal spatial organization towards the courtyard, despite having more space. Therefore, shrinking and compacting spaces show lower variance values. Only the variance values of Sapandere, MGF Ovadan, and Kozacılar farms are at higher levels nowadays due to the increase in the walkable surface area of the farms according to their needs. as a result, we cannot accept the addition of new functions or the layering of spaces as a factor that increases the variance value in the context of farms because this increase in function and layering reduces the variance value when it is inward.

5.4.3. Radial Data Results

Radial data analysis was performed in this section to examine the preliminary and existing farm conditions. Radial mean and radial variance parameters were used in this analysis. The radial mean parameter looked at the average length of all rays that can be reached 360 degrees around the selected point. Thus, the depth, differences, and changes visible to the human eye were examined in proportion to the size of the spaces. With radial variance, it was examined how complex the spaces were depending on the difference in the lengths of these rays among themselves. In terms of pre- and post-farm conditions, there was only a change in the position between the farmhouse and lodgement structures in some farms according to the management style of the farms. In comparing pre- and post-farm conditions, spatial changes that emerged according to agricultural production needs in the farms have reduced the radial mean value today and increased the radial variance value.

The values for connectivity and integration were compared to the mean radial value hierarchy based on spatial order, and the results were partially similar. The reason for the statement "partially" is that there was no ranking in the blue category in the table created for connectivity (Table 11). It was concluded that this ranking did not occur because the radial mean parameter was more related to the topology of the space than human movement. The table created for this purpose is in the mean radial section (Table 16). In addition, the preliminary and existing farm conditions of farms were compared. Accordingly, while the radial variance value of all farms was expected to decrease, the same situation was not observed in all of them. Because when new spaces were added and divided, if the farms were divided towards the courtyard, the variance value decreased, or if external structures or enlarged courtyards were added, the radial variance value increased. Especially in Turkey, adding special storage areas, toilets, and other spaces to farms with "good agricultural practices" has created many depths. Still, the variance value has decreased since these depths have been formed with reduced surface areas and regular geometries.

These analysis results can provide important design clues for farm owners when determining the hierarchy of spaces in their farms or for farm users when determining the

hierarchy of the farm in terms of control. If the farm owner resides permanently, the farmhouse needs to be the primary space for visual control, workflow, and security, depending on the farmhouse's location. Because if the farmhouse's location does not have the highest degree of radi'l mean value, anyone visiting the fa'm may not be the primary farm user.

Furthermore, given the changes in farm usage, it may be necessary to rearrange the locations of spaces based on their respective functions. These analysis results can provide an important basis for decisions to be made to increase productivity in farms. The analyses presented in this section provide a comprehensive perspective on farms' preliminary and existing farm conditions. It has been observed that old farms create various compressions or disconnected spaces while adapting to modern agriculture. Compressions were observed in the spaces, especially in farms where the variance value decreased. Since future agricultural technologies and social needs cannot be known when farms are designed, it is important to design farms because they can grow linearly in one direction. Because in old farm structures, especially those surrounded by structures on all four sides, some spaces have been given up or compressions have been created. Due to economic concerns, it has not been feasible for farm owners to demolish the structures on one side of the farm.

In conclusion, radial data analysis is an important parameter for understanding farms' spatial organization and topology from a human perspective. It can provide a comprehensive perspective for farm owners and architects. These analyses can be used to compare the preliminary and existing farm conditions of farms and to rearrange the functions and locations of spaces in farms.

5.5.Analysis of Individual and Common Spaces

This section will examine the relationship between the social areas in the farms and courtyard, farmhouse, lodgement and total mean cell. While a specific analysis was made for the parameters in the previous sections, it can be said that a spatial analysis will be made in this section. Because these areas, which are almost present in every farm today, occupy much space spatially and are

where users spend the most time. Since analyzing the preliminary-existing situations is more of a priority in this section, only nine farms with both situations are included in the analysis of this section.

Four social areas have been defined, which are;

- Individual Open Sitting Area
- Common Open Sitting Area
- Individual Dwelling Area
- Comment Sitting / Office Area

Although most of these places are not named as such by the farm owners, there is a distinction in many of them, and the locations on farms are becoming specialized according to our definition. Four different space syntax parameters will be examined for these places: integration, mean depth, isovist area, and occlusivity. The values of existing and preliminary situations are in the tables below (Table 17 & Table 18). In the preliminary situations, no closed or open areas are defined as personal seating areas according to the declarations of the farm owners. The main reason for highlighting collective farm life in the past is a lack of clear differentiation, even in social areas within farms. This lack of distinction is evident in the spatial organization of the entire farm. However, such places are beginning to emerge today due to socio-economic distinctions, and their syntactic positions on farms will be interpreted.

The integration will be interpreted regarding the relationship between the farm and the rest of the area. Mean depth will be examined in terms of the depth of the farm and the hierarchy of other areas. Isovist area will be interpreted in terms of how visible they are on the farm. Finally, occlusivity will be examined to determine whether they are personal or general areas based on their closure. Line graphs were used for this interpretation. A line graph containing all the spaces for each parameter and a line graph containing only the common open sitting area will be used. The reason for separating the common open sitting area alone is that it is a common area in all farms in both existing and preliminary situations.

Table 17: Existing Social Areas Values

EXISTING	INTEGRATION	INTEGRATION2	INTEGRATION3	INTEGRATION4	MEAN DEPTH	MEAN DEPTH5	MEAN DEPTH6	MEAN DEPTH7
	Individual Open Sitting Area	Common Open Sitting Area	Individual Dwelling Area	Common Sittin/Office Area	Individual Open Sitting Area	Common Open Sitting Area	Individual Dwelling Area	Common Sittin/Office Area
Sapandere Çiftliği	3662899.95	5211655.892			1.8347	1.6826		
Mustafa Fırat Çiftliği	775970.563	1670698.371	281985.7682	1036117.663	2.5314	1.9897	2.3297	2.055
Özgiray Çiftliği	155315.4909	3345399.84	20697.058	7250.5549	2.3085	1.821	2.6134	4.3124
Yolaçan Çiftliği	2395034.919	2553841.627	382480.209	479461.0399	1.8459	1.7671	2.1629	2.2709
Gürani Çiftliği	1045953.124	1591171.634	78861.3154	211089.7845	1.7747	1.5424	2.4763	2.0982
Eski Teke Çiftliği	1386193.094	5246655.584			2.0691	1.477		
Batakçı Kerim Çiftliği	452129.8445	2520367.785	781226.9427	101401.3955	2.2413	1.7178	2.0658	2.5771
Kozacılar Çiftliği	45271.1894	1931701.357	216936.998	227567.5916	2.5548	1.5145	2.23	2.1837
Ovadan Çiftliği	1425313.831	3262434.695		981152.6441	2.2066	2.1035		2.1402
AVERAGES	**1260453.556**	**3037102.976**	**293698.0486**	**434862.9533**	**2.151888889**	**1.735066667**	**2.309683333**	**2.519642857**
EXISTING	**ISOVIST AREA**	**ISOVIST AREA8**	**ISOVIST AREA9**	**ISOVIST AREA10**	**OCCLUSIVITY**	**OCCLUSIVITY11**	**OCCLUSIVITY12**	**OCCLUSIVITY13**
	Individual Open Sitting Area	Common Open Sitting Area	Individual Dwelling Area	Common Sittin/Office Area	Individual Open Sitting Area	Common Open Sitting Area	Individual Dwelling Area	Common Sittin/Office Area
Sapandere Çiftliği	12325602.28	16811462.6			0.1691	0.1605		
Mustafa Fırat Çiftliği	4822243.939	7493216.872	1426611.089	4387767.824	0.2579	0.1539	0.2514	0.3024
Özgiray Çiftliği	667426.3991	11273313.15	190628.1192	169685.0999	0.1337	0.0762	0.4163	0.8265
Yolaçan Çiftliği	9873425.928	10989133.39	1874340.852	2360804.582	0.1337	0.0762	0.4163	0.8265
Gürani Çiftliği	6765933.518	10711402.73	974630.9513	1418753.557	0.2259	0.2431	0.1777	0.1566
Eski Teke Çiftliği	1386193.094	5246655.584			0.3305	0.1174		
Batakçı Kerim Çiftliği	2695986.057	10987279.32	3530134.132	833294.5894	0.2901	0.1891	0.3189	0.42
Kozacılar Çiftliği	621496.1463	9820427.37	1242350.676	1583267.836	0.7089	0.1615	0.3278	0.2206
Ovadan Çiftliği	7063179.904	11380224.72		3487822.715	0.1831	0.222		0.1853
AVERAGES	**5193743.03**	**10523679.52**	**1539782.637**	**2034485.172**	**0.269211111**	**0.155544444**	**0.318066667**	**0.391128571**

Table 18: Preliminary Social Areas Values

PRELIMINARY	INTEGRATION	INTEGRATION2	INTEGRATION3	INTEGRATION4	MEAN DEPTH	MEAN DEPTH5	MEAN DEPTH6	MEAN DEPTH7
	Individual Open Sitting Area	Common Open Sitting Area	Individual Dwelling Area	Common Sittin/Office Area	Individual Open Sitting Area	Common Open Sitting Area	Individual Dwelling Area	Common Sittin/Office Area
Sapandere Çiftliği		3706715.107				1.5092		
Mustafa Fırat Çiftliği		552043.1111				1.6641		
Özgiray Çiftliği		5674136.019				1.4418		
Yolaçan Çiftliği		5531338.629				1.5941		
Gürani Çiftliği		3323488.959		238832.2852		1.3737		2.1105
Eski Teke Çiftliği		530478.5521				1.6247		
Batakçı Kerim Çiftliği		3225788.066		1665425.653		1.6061		1.8966
Kozacılar Çiftliği		1434871.251		278542.6993		1.5604		2.2092
Ovadan Çiftliği		461126.7341		461126.7341		1.5957		1.8966
AVERAGES		**2715554.048**		**660981.8428**		**1.5467625**		**2.028225**
PRELIMINARY	**ISOVIST AREA**	**ISOVIST AREA8**	**ISOVIST AREA9**	**ISOVIST AREA10**	**OCCLUSIVITY**	**OCCLUSIVITY11**	**OCCLUSIVITY12**	**OCCLUSIVITY13**
	Individual Open Sitting Area	Common Open Sitting Area	Individual Dwelling Area	Common Sittin/Office Area	Individual Open Sitting Area	Common Open Sitting Area	Individual Dwelling Area	Common Sittin/Office Area
Sapandere Çiftliği		14657823.97				0.1351		
Mustafa Fırat Çiftliği		5293884.674				0.1829		
Özgiray Çiftliği		17947429.83				0.2549		
Yolaçan Çiftliği		16505177.45				0.1356		
Gürani Çiftliği		14369503.46		1274335.064		0.2254		0.1731
Eski Teke Çiftliği		3612053.143				0.2655		
Batakçı Kerim Çiftliği		12476738.95		6508685.448		0.0974		0.2742
Kozacılar Çiftliği		8957189.662		2364576.581		0.1858		0.3551
Ovadan Çiftliği		7359728.125		2823137.552		0.2295		0.2155
AVERAGES		**11244392.14**		**3242683.661**		**0.190233333**		**0.254475**

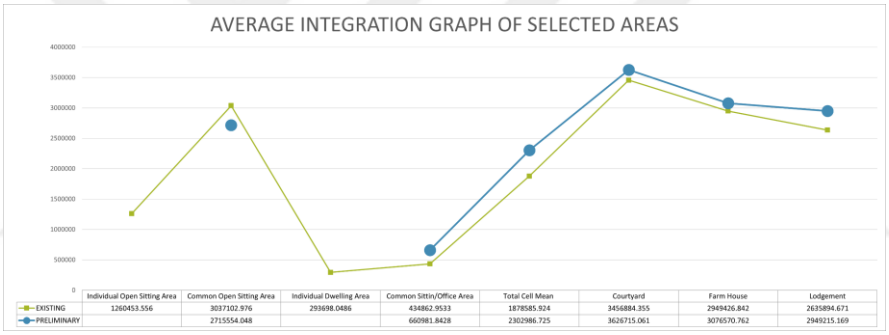


Figure 201: Average Integration Graph of Selected Areas

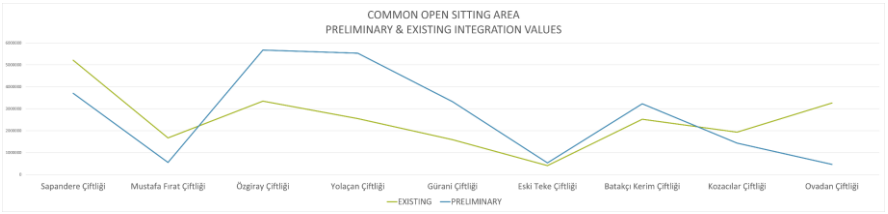


Figure 202: Common Open Sitting Areas Preliminary & Existing Integration Values

Integration values are found in the graphs above (Figure 201 & Figure 202). According to the first graph (Figure 202), the ranking of averages is as follows: “Courtyard > Common Open Sitting Area (COSA) ≥ Farm House > Lodgement > Individual Open Sitting Area (IOSA) > C (CSOA) > Individual Dwelling Area (IDA)”. Although there are farm variations, the expected average was in this direction. As per their definitions, the relationship of these spaces to the rest

of the farm should have been COSA > IOSA > CSOA > IDA. This ranking is directly related to the frequency of use of these spaces. On farms, IOSA and IDA spaces are especially needed when there are both employees and special guests. Daily, all farm users spend their time in the general areas according to the weather conditions.

The fact that COSA and courtyard are closely related is not just relevant today. Previously, COSA was directly related to the semi-open area of the courtyard kitchen. Still, it needs to be directly related to the courtyard, lodgement, and farmhouse, because the courtyard kitchen is mostly unavailable. We can say that it has a central role in the farm. On the other hand, if there is a CSOA, food and drink service is provided from this space to COSA, and if there is no CSOA, it is done from the lodgement or farmhouse, which shows a very high integration value. These spaces show lower integration values today because social spaces have increased, and the increase in other farm spaces and landscape elements are the biggest factors.

On the other hand, the preliminary and existing status of COSA appears to be more integrated with the existing status of the five farms. On the contrary, in Sapandere, MGF, Ovadan, and Kozacılar farms, the biggest factor for this is that they have grown outward compared to their old state, so they are more integrated today. We can say that CSOA called the closed version of COSA, is a secondary general seating area. Due to its office function, it is a space where paperwork, business agreements, shopping, and guests are received, rather than farm employees.

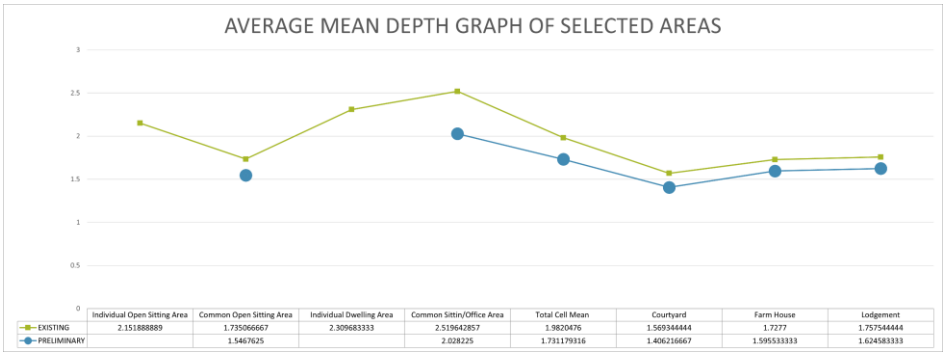


Figure 203: Average Mean Depth Graph of Selected Areas

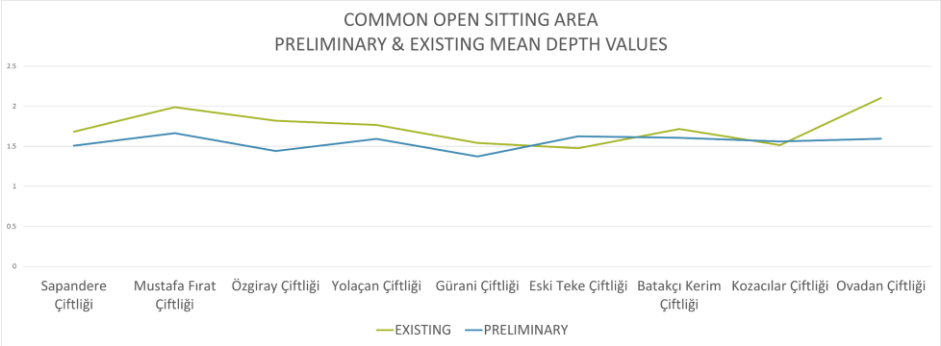


Figure 204: Common Open Sitting Areas Preliminary & Existing Mean Depth Values

According to the integration table shown in the above figure (Figure 204), all farm social areas exhibit deeper values nowadays. It can even be considered a design necessity for COSA to have almost the same value as the courtyard. The first places perceived structurally when entering farms are the farmhouse or the lodgement. Still, a control point is needed to perceive the person entering, which is where COSA comes in. As the main doors of farms are usually open throughout the day, we can say that having a seating area at the same depth level as the courtyard is more of a necessity than a design decision for farms. It is also a space actively used in summer and winter due to the mild climate of Cukurova. The mean depth value seems deeper in integration, although CSOA is more integrated than IDA on average. That is because CSOA areas show deeper values due to their narrow areas resulting from low user capacities.

On the other hand, when we look at the existing and preliminary COSA values of all farms, only Eskiteke and Kozacılar farms exhibit shallower values today. Still, more farms were deviating from the average regarding integration because the integration value is directly related to the surface area. In contrast, spaces directly related to the shallowest space have similar values even in different farms. That becomes understandable since farms resemble each other over time. All farms have mean depth values between 1.5 and 2 except for Ovadan farm. When we do not include the landscape area in the entrance section of Ovadan farm, the value will still be between 1.5 and 2. Since the landscape area and the farm courtyard are separate spaces, we can accept Ovadan's mean depth value as lower.

In general, we conclude that the mean depth value of COSA should be close to that of the courtyard. COSA is the only space we can consider as the highest frequency of use and the control point in the farm.

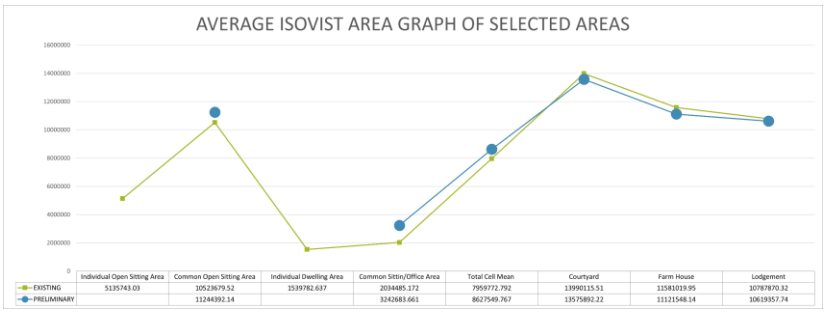


Figure 205: Average Isovist Area Graph of Selected Areas

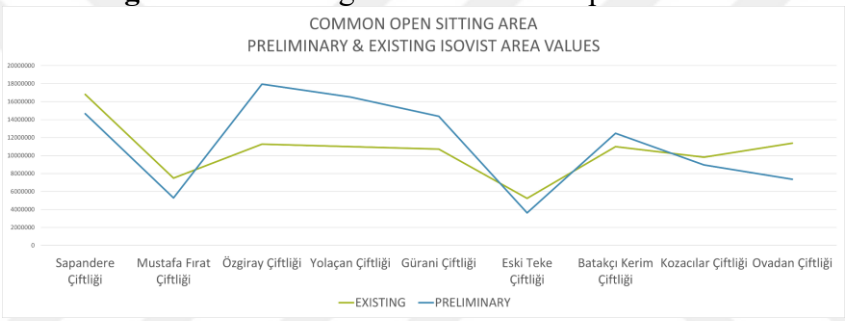


Figure 206: Common Open Sitting Areas Preliminary & Existing Isovist Area Values

Isovist area values also show similarities with integration to a great extent. Still, if we rank the average values, we conclude “Courtyard ≥ Farm House ≥ Lodgement ≥ Common Open Sitting Area (COSA) > Individual Open Sitting Area (IOSA) > Common Sitting / Office Area (CSOA) > Individual Dwelling Area (IDA)”. Although the difference between COSA is very small, it is below Farmhouse and Lodgement. Because when getting the value from the COSA, we assume it is like a person who can see 360 degrees and stand still. However, if we include all the areas that the total of 4 grids intersecting in Syntax 2D can see, assuming that two people sit in COSA, the situation approaches that of integration again. Farmhouses and lodgements give higher isovist areas because they directly face the courtyard, and there is no obstacle.

On the other hand, as in integration, Kozacılar and MGF Farm give higher isovist area values here because these farms have almost doubled their surface area today, so we see much higher isovist area values.

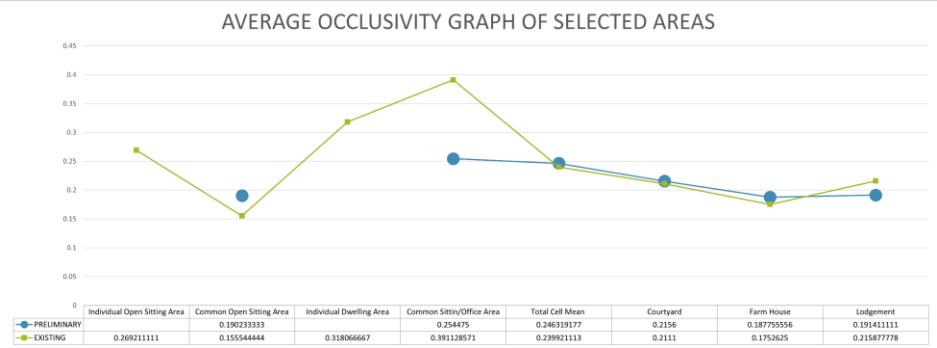


Figure 207: Average occlusivity Graph of Selected Areas

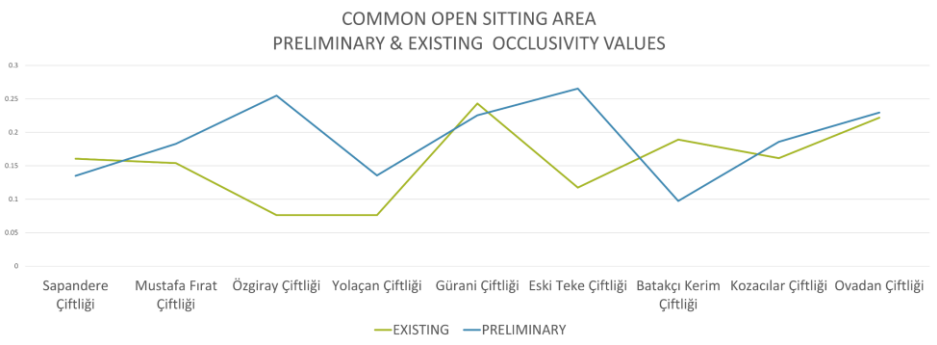


Figure 208: Common Open Sitting Areas Preliminary & Existing Occlusivity Values

Regarding occlusivity values, COSA is less enclosed, while CSOA is a more enclosed space. That is because in the existing situation, if we generally refer to CSOA as office space, in the preliminary situation, the inside of the courtyard kitchen is CSOA. In the preliminary situation, the outside of the courtyard kitchen is COSA. According to this graph (Figure 208), COSA is a more open space today because farm users have decreased significantly. Previously, farms were inhabited by four lodges and large families with an average of ten to twelve people. Today, this number has decreased by half, which requires the common social area of the farm to be less enclosed. On the other hand, IOSA has an occlusivity value almost twice that of COSA. This level of enclosure is almost always achieved with landscape elements in almost all farms.

Generally, the ranking of "Common Open Sitting Area (COSA) > Farm House > Courtyard > Lodgement > Individual Open Sitting Area (IOSA) > Individual Dwelling Area (IDA) > Common Sitting / Office Area (CSOA)" emerges. Since this ranking is the same as the frequency of use in farms, a relationship can be established between the occlusivity value and the

frequency of use of social spaces in Cukurova's farms. The main reason for this being specific to Cukurova is that the mild climate conditions do not significantly affect the frequency of use in open and enclosed spaces.

5.6. Analysis Syntheses

In this section, a summary of the results of all sections will be provided. Since the farms in Cukurova have similar functions and are subject to the same agricultural and climatic conditions, they exhibit many common features. The field study section discusses the common features and design problems arising from these common features with the question-answer data obtained. In the space syntax section, the common areas identified in the field study were grouped, and the areas were determined. Quantitative data resulting from the spatial organization of the farms was discussed with qualitative variables based on these areas.

Common spaces and their features in the current fieldwork were first described. Then, these spaces' continuity, new additions, and disappearance were discussed for preliminary and existing farm situations. There has certainly been a significant change in agricultural production and social understanding in Cukurova. That is because not only has the use of spaces changed but also because many agricultural and social spaces have had to be brought to farms due to insufficient existing spaces. Although the subject of agricultural heritage was not the focus of the study, the inability to preserve disappeared spaces and the failure to preserve both the structural material use and social integrity in farms can be considered a cultural heritage loss.

Additionally, agricultural and social life has changed, and agriculture in Cukurova has progressed positively due to urban and rural areas' growth and transportation infrastructure. Unfortunately, as all farmers have indicated, residency in rural areas and farms have decreased, and workers have started to live in cities or the nearest villages and towns. In the analysis section, this situation's positive and negative aspects have been discussed operationally and spatially. However, in addition, the failure of the development of these cities and transportation networks

to reflect in rural areas, and the dependence on cars to access various social services provided by the state, gradually dilutes life in farms and rural areas.

In the Space Syntax section, the primary focus is on analyzing and discussing the spatial organization of farms in both existing and preliminary states. This analysis encompasses five main areas: the courtyard centre, farmhouse, lodgement, main storage, and workshop. A common point has been found in the isovist and graph data sections. The farms in the study can be categorized using the table in the connectivity section (Table 12). This categorization mainly concerns the farm owner's operating model and accommodation status. In addition, old farms have grown inward or have been divided because they could not expand beyond the boundaries of their courtyards. According to fieldwork, the inward growth of farms that have added so many new spaces creates syntactic data that produces visually dominant and poorly integrated farms that are not as expected.

In addition to the space syntax section, a special analysis has been conducted on the newly added social areas. These social areas have been classified into four different classes: individual open sitting area (IOSA), common open sitting area (COSA), individual dwelling area (IDA), and common sitting/office area (CSOA). While COSA is present in all preliminary conditions, CSOA is found in a few farms. All personal areas are observed in existing conditions. If they live on their farms, farm owners need areas separated from agricultural production due to current social conditions. While personal spaces are strictly separated in some farms, visually separated areas are created through landscape design in others. As a general comment, it has been observed that the landscape design of these personal spaces is more positive for the working and patron relationship when the separation is smoother. That is because the rural working environment does not have as much distinction between workers and employers as in urban areas, and these areas are not just workplaces for both patrons and workers, so the separation of personal spaces is a significant design factor.

As a result of all these analyses, three model farm master plans are created, as seen below (Figure 209, Figure 210 & Figure 211). In the first model, the farm owner is designed as a

permanent resident of a family business model. The second model is a company or multi-partner farm where the farm owner temporarily stays. The third is a direct company model; the farm owner has no house. Firstly, they all have a common point of frequency. The most frequently used areas face north and are planned in a semi-open area where they can stay in the shade during hot months.

These master plans are designed to serve an average of 150 to 500 hectares of land. The location of the land may vary according to its position on the main entrance road. A parallel plan layout has been adopted concerning the main road. In addition, due to the farms that cannot be expanded within the scope of the analysis, a solution with a narrower and longer courtyard has been developed, and a growth direction without a building where needs can be met has been left towards the direction specified in the plans. This area is important because it is suitable for new structuring according to all kinds of future needs that farmers may encounter. Large truck trailers entering the farm should be able to exit from the growth direction without manoeuvring inside the farm. It is important to have a large shaded tree planted in the middle of the courtyard to prevent this manoeuvre situation. Another common issue is that the entrance to the farm and the entrance to the land are opposite, which is important for all farm users. Especially it is not necessary for people who come for work other than those who stay on the farm to see the entire farm. There is also an irrigation centre at the beginning of the road, where all kinds of water used on the farm can be obtained from the well.

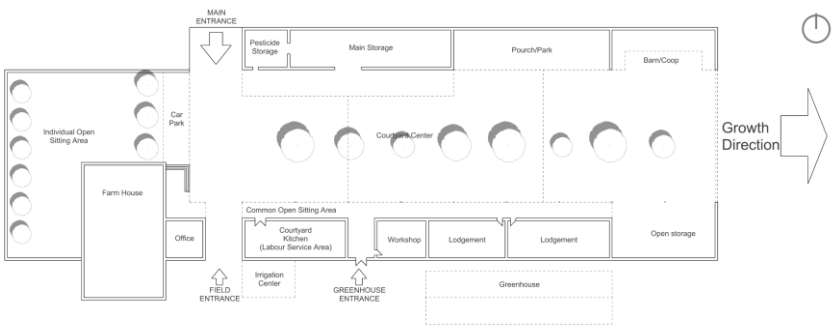


Figure 209: Synthesis Result of Farm, Model 1

In this model (Figure 209), the farm owner's house is in a position that has direct visual dominance over all entrances and exits of the farm. In the lodgings, they have direct visual dominance over the agricultural areas, providing complete control over the farm. Because having such a cross-control situation between the farm owner and the workers strengthens the control of the farm. However, since different lives are led in the lodgings and farmhouses, these places are not close to each other. COSA links both. COSA is associated with the courtyard kitchen. Although the courtyard kitchen is not seen in most farms today, it is evident that it had an important place in old farms. Therefore, a new definition is required for the courtyard kitchen. The courtyard kitchen should serve as an important service area where all farm users with WCs, dressing rooms, and full or small kitchens can sit during the day, not just for meals. Otherwise, in cases where this service is provided from the farmhouse or lodgings, it may cause disruptions in the balance between private and business life. In addition, since families live in the lodgings, a collective life structure is planned that can provide various job opportunities for both men and women.

The workshop is directly related to the lodgings and COSA. There is a direct connection to the greenhouse on the farmland at the entrance. Since the greenhouse has a higher frequency of use than the land, it must be directly related to COSA and the workshop. At the same time, a space has been left for tractors or equipment repair work. Since all the north-facing areas have high frequencies, they must be solved together.

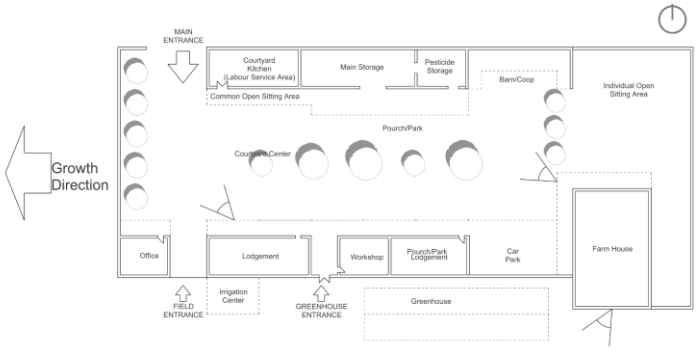


Figure 210: Synthesis Result of Farm, Model 2

The second model differs from the first model in only one aspect, which impacts not the overall syntax of the farm but specifically the syntax of the lodgings and farmhouses. Personal areas and a farmhouse overseeing the farm hold no significance in cases where the farm owner does not permanently reside. Even employees with full-time control of the farm may not have visual dominance over the farm. Therefore, visual dominance over the entire farm is better achieved in a planned layout with two lodgings, providing security and control.

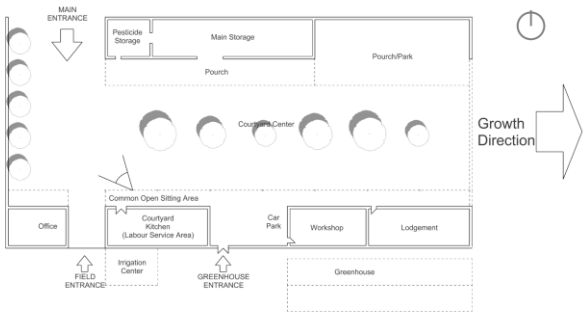


Figure 211: Synthesis Result of Farm, Model 3

Finally, the third model is designed as a company farm with no farmhouse. Since there is no farmhouse in this case, the concept of personal space is also eliminated. Because the relationship between the patron and the employee has become a direct collective business model. Again, COSA is in the most dominant position, and the lodgings are in the same row. Visual dominance is prioritized over the storage areas rather than the lodgings and the farmhouse.

As a result, master plans have been created that are a farm design guide that brings together all observed situations. Personal decisions such as the interior design of lodgings and farmhouses have been ignored because it is impossible to speak of a common situation regarding factors such as the number of users, and cultural differences, in the Cukurova region. Generally, collective culture in old farms, working flow, visual dominance, social areas, and employee-boss relationships have been tried to be designed as mixed models.

5.7. Chapter Results

This section discusses the analysis, interpretation, and results of the study. It is divided into five parts: field study analysis, isovist data, graph data, radial data, and individual and common spaces analysis.

The field study analysis was conducted based on observations and questions & answers during fieldwork. The history of the farms and the regions where they were built showed significant common characteristics. The main element in farms is the courtyard, which serves as a connecting space. While the form and location of the courtyard may vary from farm to farm, its fundamental purpose of providing a spacious opening and organizational feature is common in all farms. On the other hand, there is no common situation between the orientation of the buildings.

The isovist data analysis examined the selected isovist parameters for the preliminary and existing farm plans. The isovist area, perimeter, and occlusivity were analyzed. The relationship between the isovist area and perimeter and the most visible areas of the farms was discussed. When examined in terms of change, farms exhibit variability in the relationship between farmhouse, lodgement, and storage based on operational and user requirements. Although they yielded the same results in their preliminary stages, the isovist values of farms today have directly reflected the operational and social variations.

The graph data analysis showed the similarities, differences, and changes in the preliminary and existing situations of the farms. In addition to the tables, graphs showing the similarities, differences, and changes in the preliminary and existing situations of the farms were presented. In graph data analysis, all parameters have shown parallel results. It can be stated that farms today are creating deeper spaces while also becoming more integrated.

The radial data analysis examined the selected radial parameters for the preliminary and existing farm plans. The radial mean and radial variance were analyzed. Unlike isovist and graph data, radial data has provided more topological variations. It can be said that farms, particularly

in contemporary times, have become more layered and developed more complex layouts due to the creation of new spaces.

The individual and common spaces analysis examined the individual and common spaces observed in farms. The analysis examined the relationship between farm social areas, including the courtyard, farmhouse, lodgement, and total mean cell. The results showed that the integration values ranked the areas as Courtyard > COSA ≥ Farm House > Lodgement > IOSA > CSOA > IDA. Mean depth values indicated the importance of COSA being at a similar depth level as the courtyard. The isovist area values followed a similar pattern to integration, while occlusivity values showed COSA as less enclosed and CSOA as more enclosed. These findings provide valuable insights into the spatial characteristics of social areas in farms, emphasizing the need for their consideration in farm design.

Based on all the analyses conducted, the direction of farm transformation and the spatial relationships of farms were discussed. As a result of the synthesis of these analyses, a farm master plan was created with a focus on spatial relations. However, these plans can be considered as averages of the farms included in the scope of the study, rather than a design guide. In reaching this average farm plan, the analysis results and inferences were taken into account, with a greater emphasis on spatiality.

In summary, the study has revealed the common characteristics of farms, the prominent areas within farms, and the changes that occur over time. While the courtyard remains a fundamental feature in all farms, personal spaces create increasingly complex spatial configurations, blurring the boundaries between work and private life in farm plans. The primary driver for the transformation of farms is agricultural production methods, while personal life within farms has also transformed in line with contemporary privacy perceptions. The analysis provides significant insights into farm design and spatial relationships.

CHAPTER VI

CONCLUSION

Cukurova, an important region for development, has a long history of agriculture. Its favourable conditions have supported various crop cultivation since ancient times. Archaeological sites reveal ancient farming practices, while novels provide insights into farm life during different periods. Modern Cukurova farms reflect its historical and environmental characteristics. However, there is a gap of 1500 years in agricultural data. Many unstudied mounds have become agricultural land, and natural disasters may have erased ancient farm structures. The study also focuses on the transformation of Cukurova farm spaces in recent years, with a shift towards horticultural crops and environmental behaviour change. This transformation has impacted farm spaces.

Within this thesis's fieldwork scope, 15 farms in Cukurova have been analyzed. All the farms are located in the plain region of Cukurova and were selected from Mersin and Adana. The most important criterion for selection was that the farms had a minimum of 50 years of agricultural history. That is because the farms included in the study were chosen to examine the transition from field crops to horticultural crops in Cukurova and to observe how this agricultural change has affected the spatial aspects.

In the field studies, through interviews and observations with farm owners, lists of spaces and functions of the farms were compiled. Since all farms serve a minimum of 150 acres of land, their function and space lists show significant similarities. Thus, the main spaces and their descriptions of the multifunctional structure group called 'farm' have been determined. In this way, a primary needs list has been created to design farms in the Cukurova region. On the other hand, preliminary space lists for the farms have also been generated in addition to those created for the existing conditions. Although there are still common spaces and functions, various spaces

have become obsolete and disappeared following the needs of the present day. Making a significant distinction between these obsolete and disappeared spaces is important. Determining whether this is due to technological change or social relations and cultural change is crucial. Because technological changes in agriculture are generally global and result in ordinary and life-facilitating changes in farms, while cultural changes can vary on a smaller scale and depend on different factors. Technological developments have completely changed farms, especially agricultural, livestock, and domestic water usage. In this transformation, water installations and irrigation centres have replaced wells, cisterns, shared baths, and conventional watering troughs. In most of the farms covered in the study, there is no electricity in the preliminary state. However, since electricity has been present in all farms since the 1950s, the change it has brought about could not be obtained through observations or interviews.

On the other hand, cultural and social change has created new social spaces. In particular, the change in the concept of privacy has led to clear distinctions in the social spaces of workers and owners. In the preliminary stage, the courtyard kitchen was the social centre of the farm, but in existing farms, this concept of a social centre has become uncertain and open to discussion. Therefore, it was necessary to define and describe the new social spaces on the farms. The space that closely resembles the definition of the courtyard kitchen is the common open sitting area (COSA). However, the frequency of COSA usage has decreased due to the presence of social spaces with higher privacy. Farmers have provided the following interpretation through interviews: the hierarchy between workers and owners is only observed in the farm environment, but it does not exist in the main working areas such as fields and gardens. As almost all farms in the scope of the study have farmhouses and are family-run businesses, they have stated that the relationship between workers and owners is not limited to the farmyard but remains socially active outside the working hours of the farmyard. Therefore, there is feedback that workers do not want to live in staff accommodations, no matter how comfortable they are. The factors contributing to this situation are the inadequacy of government services infrastructure (schools, hospitals, roads), which leads workers not to want to reside on farms with their families.

On the other hand, due to socio-economic and cultural differences, the definitions of privacy vary for each farm user. This differentiation in definition has also changed the collective functioning of labour on farms and created hierarchical spaces similar to those in offices in the city. Many farm owners associate this situation with the inability to find families to reside on farms.

If we move on to the syntactic analysis, the qualitative study mentioned in the previous paragraph has provided a numerical reading of these qualitative conditions, confirming the qualitative analysis. Initially, to understand the general spatial organization of farms, the relationships between the designated areas were analyzed and discussed through various parameters. These spaces include the farmhouse, staff accommodation, main storage, workshop, and courtyard. No clear association was reached when syntactically analyzing these spaces' hierarchy, usage frequency, and relationship. However, by defining the farms according to their operating models and the residency status of the farm owner, a common conclusion could be reached. Assuming that all farms have the same model and the farm owner resides on the farm in the preliminary state, organic changes over time have shaped the spaces with various differentiations, mergers, and expansions based on the operating model and the farm owner's residency. Thus, the operating model and farm owner's residency status emerge as undeniable parameters in farm design.

On the other hand, the importance of the presence and usage activity of COSA (common open sitting area) in farms for the continuity of the social relationship between the farm owner and the workers also appears in the syntactic parameters. In the preliminary state, COSA, known as the courtyard kitchen at that time, was a social space serving dozens of people, but in the present day, the courtyard kitchen is not observed at all. There has been a decrease in the frequency of COSA usage, and it is even found in farms where the workers and the farm owner have completely separate courtyards. The syntactic parameters are prominent in the preliminary state, where the workers and the farm owner's families coexist in crowded conditions and are not

observed in the existing state. The qualitative evaluation revealed that the social and operational disconnections in the farms might be related to this area.

Based on the analysis results, three separate farm master plans have been created considering the identified conditions. While attention was paid to the architectural geometry and dimensions of the spaces during the creation of these plans, the main purpose of the plans is to define spatial and visual relationships. However, depending on personal needs, agricultural production, and the equipment used, dimensional and specific spatial changes can occur in farms. Nevertheless, within the scope of the analysis, the relationship between the identified main spaces is reflected in the created master plans. Particularly, the interaction between social and agricultural spaces, the socio-cultural relationship in the rural area of Cukurova, and the distinction between work and privacy have been considered.

Additionally, it has been understood through syntactic analyses that older farms have inward layering, leading to a more complex planning scheme in farms. Therefore, the inability of enclosed farms with square-like structures to expand has necessitated the integration of new functions. Thus, the need for an open courtyard space to accommodate potential social and especially agricultural functions in newly designed farms has been recognized. Overall, the syntactic and observational, i.e., qualitative and quantitative analysis results, have complemented each other and provided robust data. As a result of the synthesis of this analysis, an exemplary farm master plan could be drawn.

Beyond the scope of this study, the transformation of farms in Cukurova is entirely driven by needs, but the organic nature of this transformation is a debatable issue. Farms that have the potential to be considered agricultural and architectural heritage have undergone uncontrolled and extensive structural changes. The newest farm within the scope of the study dates back to 1955, while the oldest is older than 1850. In these farms, neither the construction materials, construction techniques, nor the spatial elements have been preserved, and we can say that the social structure has not been preserved either. In Nes's (2022) study in Norway, where most agricultural spaces and production methods are considered agricultural heritage and therefore preserved, it is possible

to say that the analysis focused on these preserved farms examines minimal social and spatial changes compared to Cukurova farms [44]. The number of residents in these farms in the rural region has remained the same for years, and new accommodations have been built using the same construction techniques according to the needs. If we compare the current situation to the past, the population residing on farms has significantly decreased, shifting towards the closest neighbourhoods and district populations. These districts and neighbourhoods have populations comparable to small-scale urban populations, exceeding 30,000 urbanized areas. In other words, the population density in rural areas is shifting towards already densely populated areas. Generally, within the scope of the study, while there are numerous demolished spaces, production methods, and declining users in Cukurova, Nes's (2022) study reveals the opposite situation. Thus, as agricultural transformation occurs in Cukurova, cultural heritage loss has also been observed [44]. Especially considering the decline in rural population and function loss, it is possible to say that this trend could lead to negative consequences in rural areas and agricultural production.

As a result of the study, the social and technological changes in Cukurova and how they are reflected in farm spaces have been analyzed and discussed comprehensively. Positive and negative aspects have been evaluated internally, and design factors that need attention and discussion in possible farm designs have been identified. This study can contribute to creating an ideal farm plan or a design guide, but it is primarily research on farm structures and the adaptation of changes in Cukurova farms to the present, providing significant design data.

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