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Architectural typology of rural housing in Jaén, Peru

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Abstract

Jaén is one of the most important cities in the northern highlands of Peru due to its strategic location, commerce, and agricultural activities. Jaén has more than 185 thousand inhabitants, of which 48% live in rural areas, representing approximately 31 thousand rural housing. This research aims to determine the types of rural housing in Jaén, showing the possible variations and architectural manifestations due to the territorial and cultural characteristics. A field observation sheet has been used to study the rural dwellings of populated centres previously classified by altitudinal regions. The results show six architectural types of rural housing classified into two groups: “rural-residential housing” and “rural-agricultural housing”. These architectural types are generally located near water sources, within agricultural plots, and on hillsides. The architectural program is characterised by agricultural activity and family composition, which has grown over time. The most commonly used construction systems are “pirca” and “quincha”, using natural materials such as “ichu” and adobe. There is also evidence of cultural traditions rooted in the construction, such as “cambio de fuerzas”, “paracaico”, and “minga”. Therefore, the relevance of Jaén’s rural housing is its geographical reading of the territory through the architectural and cultural legacy of these buildings.

Keywords: Architectural typologies, Peru, Rural architecture, Vernacular architecture, Rural housing

1 Introduction

Rural architecture is the spatial and functional response to local needs, specifically productive and residential, closely conditioned by the agricultural context (Agudo et al. 2005, 3). It represents the first victory of the rural dweller extracting sustenance from the land (Sabatino 2010, 92). Thus, rural housing is developed in a habitable environment conditioned to the geographical context and cultural roots, being the building itself an architectural component for the transformation of the territory (Ji and Zhou 2021, 15; Rivero-Lamela 2018, 66). The inhabitant himself generally builds his rural dwelling to live in the countryside and engage in agricultural activities. As a result of this practice of self-construction, the building has a direct link with the climate, the economy, the materials, and construction

techniques that contribute to the development of the cultural heritage of its rural environment (Pan, Xiao, and Suo 2021, 1; Arredondo Garrido 2021, 84; Rudofsky 1964). Hence, rural housing is conditioned to use its surroundings’ natural resources, resulting in more sustainable architecture and linked to its immediate context. (Navarro Palazón and Jiménez Castillo 2012, 86). The study of rural architecture also allows for a critical examination of the cultural and physical production of the rural environment (Donovan and Gkartzios 2014, 335). Therefore, rural architecture evidences the spatial and cultural link between the inhabitant and the riches offered by the countryside for the construction of their living spaces.

In Peru, rural housing is located in all its natural regions, which are the “Costa” (Coast), “Sierra” (Highlands), and “Selva” (Rainforest). This location is essential considering that rural housing in Peru is the result of migratory processes linked to productive activities according to the agricultural wealth of the natural

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regions. According to Peruvian government statistics, there are 2,772,404 rural dwellings, representing 29.21% of the total number of housing in Peru (INEI 2017b, 279; Montoro and Ferradas 2005, 19–21). Thus, 10.07% of rural housing is distributed on the coast, 47.86% in the highlands, and 35.39% in the rainforest (INEI 2017c). It is interesting to note that these figures show that the highest concentration of rural housing occurs in the Andean zone of Peru (highlands). Within this area are the northern highlands, a geographic territory made up mainly of the department of Cajamarca. The northern highlands also include part of the Andean mountain range, characterised by dry and humid climates. The northern highlands of Peru are home to rural housing that is related to the socioeconomic, environmental, and cultural phenomena of this territory. Thus, rural housing acquires a connection with the past to reinterpret the present problems, manifesting in its use of local resources and strategies linked to the environment (Castillo Rivadeneira 2020, 102; Correa Álamo 2000, 58).

Jaén is one of the main provinces of the northern highlands. This province stands out in the agricultural sector and commercial activities due to its strategic location in the territory (INDECI, and PNUD 2005, 1). Jaén, in its historical origins, was influenced by the diverse native cultures such as Vicús, Moche, Chimú, Cajamarca, and Chachapoyas. The city of Jaén was founded in 1807 with the official name of “Jaén de Bracamoros”, and its original location was on the banks of the “Amojú” River (MPJ 2020). In this context, the dynamics of Jaén’s rural growth were related to its location near highways that allowed the export of agricultural products and the development of housing construction, which generated a transformation in the local context and its cultural customs (Aguirre et al. 2016, 18–19; Marcelo Peña 2008, 43). Thus, local customs in Jaén are rooted in the development of their rural space. An example of this is the “coffee dance” and the “cocoa dance,” which are a staging of their agricultural work through dances in public spaces (Ipanaque Flores 2019; Olivera Núñez 2016). The city of Jaén has 31,925 rural housing, which is equivalent to 53.4% of the total number of housing (urban and rural) in its territory. This number of rural housing represents 88,989 rural inhabitants; that is, 48.0% of the total inhabitants (urban and rural) of Jaén (INEI 2017a, 25, 14, 947). These data show that in the territory of Jaén, a large percentage of rural housing persists, showing possible diversities in the physical and spatial manifestations of rural housing in this territory. Therefore, this article addresses the following research question: Which are the architectural types of rural housing in Jaén?

This research aims to determine the architectural types of rural housing in Jaén by studying its analysis

variables such as location, geographical context, architectural program, cultural manifestations, and construction system. Thus, this research will increase the understanding of rural architecture to make visible the characteristics of the Peruvian rural territory and contribute to its revaluation by the Peruvian government. In addition, the information collected as a result of this research will be a starting point for further research and, in this way, contribute to rural housing studies, which are still few in the Peruvian academic field, in comparison to the vast territory and rural population existing in Peru.

1.1 The study of rural housing in Peru

In Peru, a rural area is defined mainly as a populated centre with less than 2,000 inhabitants (INEI 2020, 263). The study of rural housing in the Peruvian academic field is a line of research with still little scientific production and whose studies focus mainly on aspects such as location, climate, culture in the way of living, and materiality. Nevertheless, some results related to these aspects are significant to highlight because they help us to understand the general characteristics of rural Peruvian housing. In the case of location, rural housing from the beginning has been located near hydrographic sources to obtain essential resources for subsistence (Burga et al. 2014, 36). Likewise, rural housing conditions its construction according to the climate variables of each territory. Thus, this strategy benefits housing through climatic conditions and generates a comfortable environment for the dweller (Teran Flores 2019, 10). As a complement to this feature, Aronés Cisneros (2021, 216) argues that the correct location of rural housing leads to the development of productive and climatic opportunities for the inhabitant and his family.

Rural housing in Peru presents socio-cultural manifestations reflected in the composition and function of its architecture. These manifestations are pre-Hispanic and predominate in rural areas (Carazas Aedo 2001, 28). These cultural manifestations may refer to activities such as dances and communal meetings practiced in spaces built inside the dwelling. However, cultural manifestations are also those referring to the construction of physical spaces such as rural housing. These construction customs are transmitted from generation to generation and are called “popular architecture”, which is considered a cultural wealth by the area’s inhabitants (Miranda North 2012, 130–134; Scaletti Cárdenas 2014, 21). The construction techniques and the use of materials are inherited from the ancestors of the rural population, and it is a way of permanently honoring their culture. Thus, the construction of rural housing is the product of a design process that is

not directly linked to an economic condition but to the ability of the inhabitants to solve the difficulties present in the rural territory using “popular wisdom” (Vargas Febres 2020, 26–27). Another characteristic of the materials used in rural housing construction in Peru is the adaptability of local materials to favor their reuse

in housing transformation and expansion processes (Toro Mayorga 2018, 171).

2 Methodology

2.1 Study site

The research is carried out in the city of Jaén, located in the department of Cajamarca. Jaén is the second most

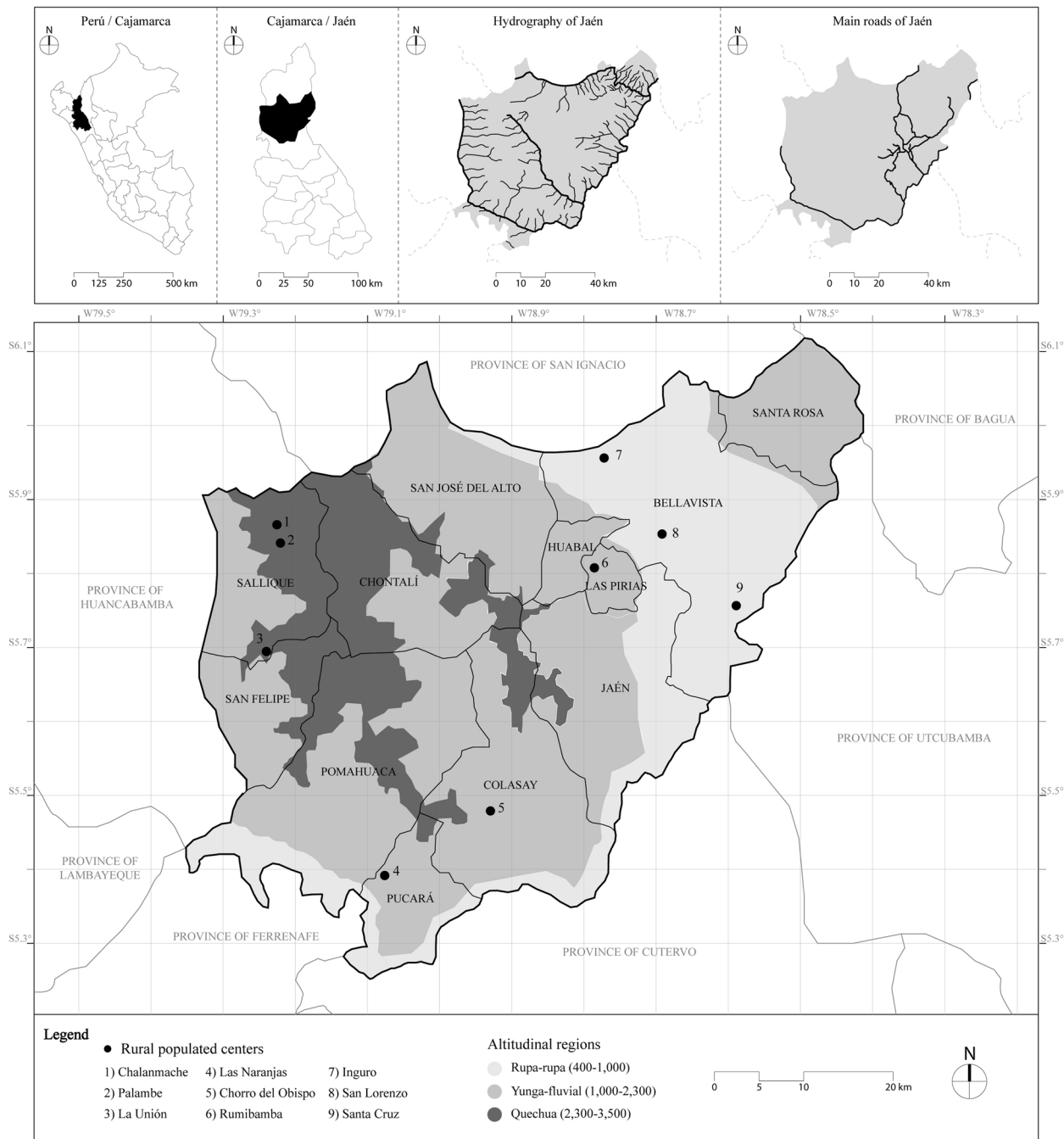


Fig. 1 Location of Jaén (Source: the author).Elaboration with data from the Municipality of Jaén (Aguirre et al. 2016)

populated city in this department and has an altitude that varies from 300 to 3,400 m above sea level (Fig. 1). This significant variation allows the generation of different altitudinal regions (also called altitudinal floors) in its territory. Jaén has an area of 5,232.57 square kilometers, which represents 15.4% of the total departmental territory of Cajamarca (Aguirre et al. 2016). Jaén, due to its altitudinal variation and territorial surface, is composed of three altitudinal regions which are the “Quechua”, “Fluvial Yunga” and “Rupa-rupa” (Pulgar Vidal 2014, 12). The Quechua altitudinal region has a territory suitable for agriculture and cattle raising. It also has temperatures ranging from 15° to 0° Celsius and frequent rains from January to March. The Fluvial Yunga altitudinal region has an inter-Andean territory with valleys and a moderately warm climate. Frequent rains determine the local agricultural calendar in this altitudinal region. On the other hand, the Rupa-rupa altitudinal region has dense vegetation, hence its local name of “high rainforest”. It also has very fertile soils and temperatures ranging between 15° and 33° Celsius.

2.2 Materials and methods

An observation form was used for data collection, based on an adaptation of similar researches carried out in Peru and abroad (Gayoso Carranza and Pacheco Zúñiga 2016; Fuentes Pardo and Cañas Guerrero 2007). Thus, the following indicators are proposed for the typological study of rural housing in Jaén: location, climate, architectural program, and construction system. The location, climate, land area, owner, and composition of the family nucleus have been recorded concerning site housing. Regarding the architectural program, the spaces, dimensions, and activities have been studied. Likewise, the spans, materials, finishes, and construction dimensions have been considered concerning the construction system. These data were recorded through various field visits where architectural surveys, photographic records, and interviews with the inhabitants were carried out to learn about their rural housing’s cultural manifestations, spaces, and activities.

To select the rural housing analysis sample, a classification of all the rural populated centres of Jaén in its three existing altitudinal regions (Quechua, fluvial Yunga, and Rupa-rupa) was considered. Thus, 131 rural population centres were considered (INEI 2020), which were georeferenced in the territory of Jaén using ArcGIS software. Thus, it was found that Jaén’s rural population centres are located according to altitudinal regions: 63 in the Rupa-rupa, 62 in the fluvial Yunga, and six in the Quechua. Then, it was decided to select three representative population centres for each altitudinal region. These nine rural population centres were selected for their territorial relevance reflected in their cultural manifestations (tasks,

“pararaico”, customs and traditions), agricultural (“minga”, local crops and “cambio de fuerzas”), and economic (traditional resources and agriculture and livestock). Subsequently, an architectural survey was made of about ten housing in each nine selected population centres. The spatial, functional, formal, and cultural characteristics of these rural dwellings analysed were synthesised into six architectural types. The results of this architectural synthesis are organised into two groups: rural-residential housing and rural-agricultural housing.

3 Results

3.1 Rural-residential housing

This group of rural housing is characterised by being located mainly in the nuclei of rural populated centres, and a strong incidence of the inhabitant’s social relations in the housing configuration. This social incidence means that the needs of each family composition govern the progressive development of the housing form. In addition, another of the main characteristics of this group of rural housing is the existence of customs linked to the construction process by the inhabitants themselves. Therefore, the names that these architectural types of rural housing acquire are related to the factors that influence the formal configuration of the building.

3.1.1 Expanded housing

This architectural type of rural housing is located in the fluvial Yunga and Quechua altitudinal regions. Although they are different altitudinal regions, they share specific climatic characteristics, such as high rainfall intensity (frequently in January to April) and strong winds (frequently in July to August). This type of rural housing is located on topographic slopes of 5° to 25° to avoid flooding and wind gusts. These dwellings are also located in concentric rural populated centres. These rural populated centers are developed on a “pampa” (flat land used for social activities) from which trails and rural housing are distributed. The expanded housing architectural type has an architectural program where the living room space is identified as the main area and distributor, in which the bedroom, dining room, and kitchen are annexed. In turn, these architectural spaces are duplicated because they are conditioned to the growth of the number of families living together in the same house; consequently, a gradual expansion of the volumes of rural housing is generated.

The architectural type of expanded housing is built through a traditional work custom that acquires the local name of “cambio de fuerzas” (change of forces). This custom consists of constructing a house through the help of family and friends in a collaborative activity. Later this help will be repaid with the same support in the construction activity of future houses belonging

to the people who had initially helped. This type of rural housing is generally built between August and December (when there is little rain). Likewise, the construction of the house is made with “adobe” in a two-level distribution. The roof of this house is built with wood, specifically

using “guayaquil” (a local bamboo species) and “maguey” (a local plant species). These local materials are also used to construct the balcony, an architectural element present in some variations of this type of rural housing. Concerning the thickness of the walls, these are conditioned to

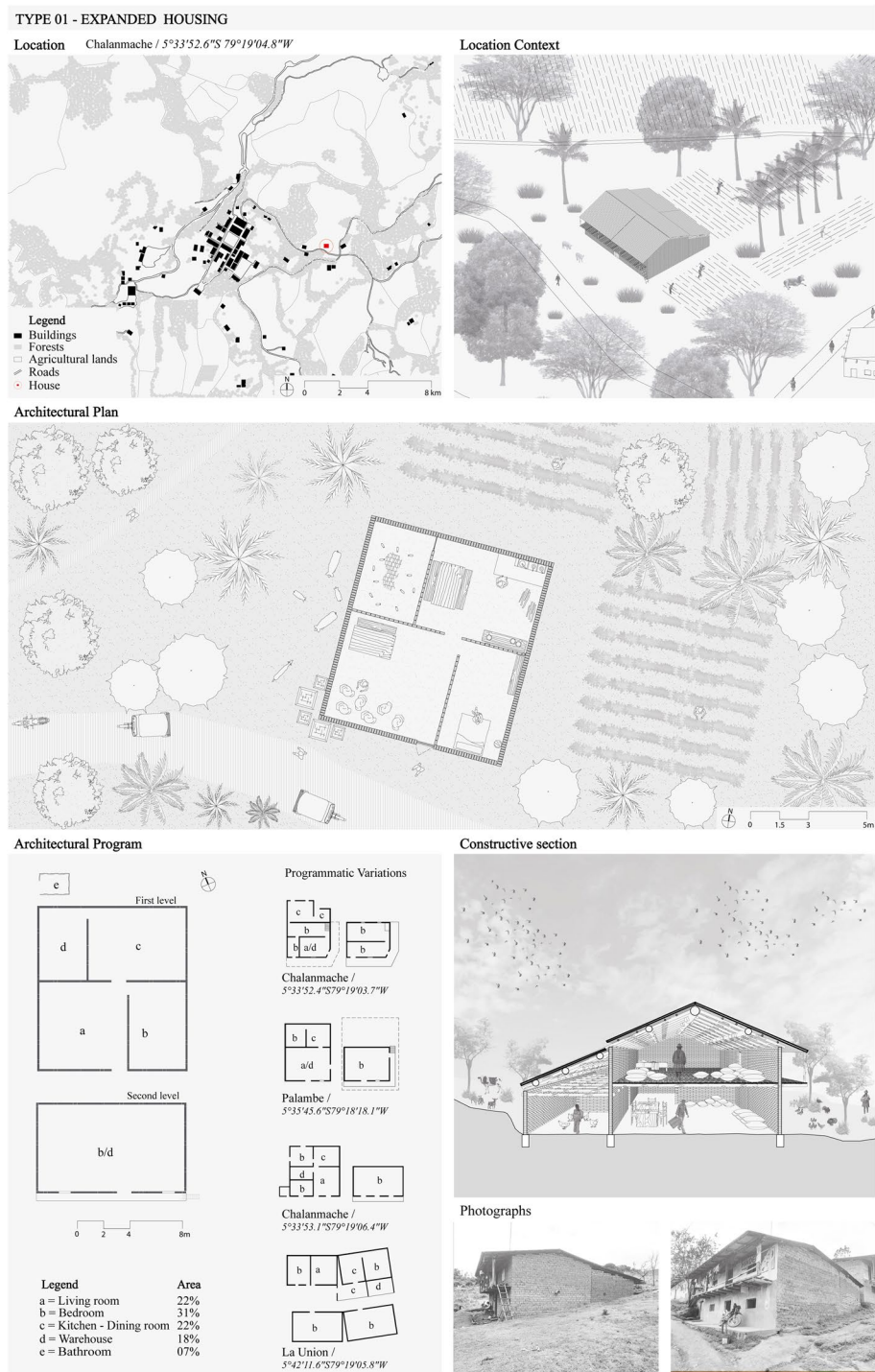


Fig. 2 Architectural characteristics of the expanded housing type (Source: the author)

the climatic phenomena mentioned above. Therefore, the perimeter walls are built with a thickness of 35 cm, while the dividing walls inside the house are 25 cm (Fig. 2).

3.1.2 Compact housing

This type of rural housing is located in the Rupa-Rupa and Quechua altitudinal regions. The rural populated centres that contain these housing units have a linear morphology characterised by highways and roads. The climate in these altitudinal regions is characterised by high temperatures (between 22° and 33° Celsius) and low temperatures (between 5° and 13° Celsius). For this reason, this type of rural housing is built in a compact form to avoid extremes of temperature, having as an architectural variation the presence of openings in warm areas and the absence of them in cold areas. Concerning the architectural program, this type of rural housing has only one space where rest, food preparation, and social activities are carried out. This characteristic makes this single space multifunctional and is reflected in the compact form of the housing. The average area of this type of rural housing is 45 m² with an approximate height of 2.50 to 3.00 m inside the housing.

Concerning the socio-cultural manifestations around the compact housing architectural type, there is a work practice called “jornalero” (day laborer). This practice involves hiring a person to work in the agricultural fields for an entire workday (considered eight hours a day). This practice implies that the housing is mainly used at night to rest during the planting and harvesting seasons. On the other hand, constructing this type of rural housing is done with the “quincha” and “adobe” construction systems. In the case of the “quincha” construction system, it is made of local materials such as “pajilla” (rice husks) and wheat stalks. These materials are mixed with mud and then placed in a structure of reeds and wooden pillars. Thus, construction times for this rural housing type vary (from 30 to 45 days) depending on the wall complexity, the drying of the mud, and the seasonal climate (Fig. 3).

3.1.3 Stepped housing

This architectural type of rural housing is located in the Yunga fluvial and Quechua altitudinal regions, which have the highest altitudes in the territory (ranging from 2,300 to 2,500 m.a.s.l.). Thus, these housing units are located in rugged topography, on slopes with topographic gradients ranging from 30° to 50°. Access to these housing units is through streets (roads or trails). These streets are elaborated using stone or soil stairs that, in turn, serve as drainage for the rainy seasons. Concerning the architectural program, this type of rural housing is distributed

in two ascending volumes. The living and sleeping spaces are in the lower volume, and in the upper volume are the kitchen and dining room. In the same way, the connection of the volumes is not through an internal circulation but external, which can be located on the main facade (street) or at the rear of the housing with small dirt roads. At the back of the house, there are also spaces for raising animals in the form of a corral made of wood or “carrizo” (a local type of reed).

In the construction process of “stepped” housing, the most outstanding cultural tradition is the “pararaico”. This tradition consists of a series of activities to celebrate the completion of the rural housing construction. The celebration is organised by the owners of the housing, who invite the workers, friends, and relatives. The celebration begins with a speech given by the owner of the house. Then, dinner is served, followed by dances with a musical band and typical drinks such as “Yonque” (sugar cane extract) and “Chicha” (made from the fermentation of corn).

The construction process of this type of rural housing is developed in three stages: the foundation, the lower block’s construction, and the upper block’s construction. The foundations are built using the “pirca” construction system and subsequent excavation and leveling of the land. Subsequently, the construction of the lower block is carried out through the use of “adobe”. Finally, the construction of the upper block is carried out using light materials such as wood, “guayaquil”, and “carrizo” (Fig. 4).

3.2 Rural-agricultural housing

The denomination of this group of rural housing is related to living and working in such a particular context as agriculture. Therefore, the architectural types of rural housing in this group maintain connectivity with the rural territory, allowing the realisation of activities linked to agriculture and animal husbandry development. Likewise, this group of rural housing stands out for the length of time residents stay in the building, which is determined by the calendar of agricultural work.

3.2.1 Qullqa housing

This architectural type of rural housing acquires the appellative “Qullqa” (term in the Quechua language) in reference to the “warehouse”, which is a characteristic space of these housing units. The location of this rural housing is oriented from east to west, allowing to capture the full sun path on the roof, which has a relationship with the attic. The housing consists of a single level with an average height of 3.50 to 4.00 m, which makes creating an attic feasible. This space is accessed through a handmade staircase usually made with “guayaquil” or “maguey”. In addition, the attic

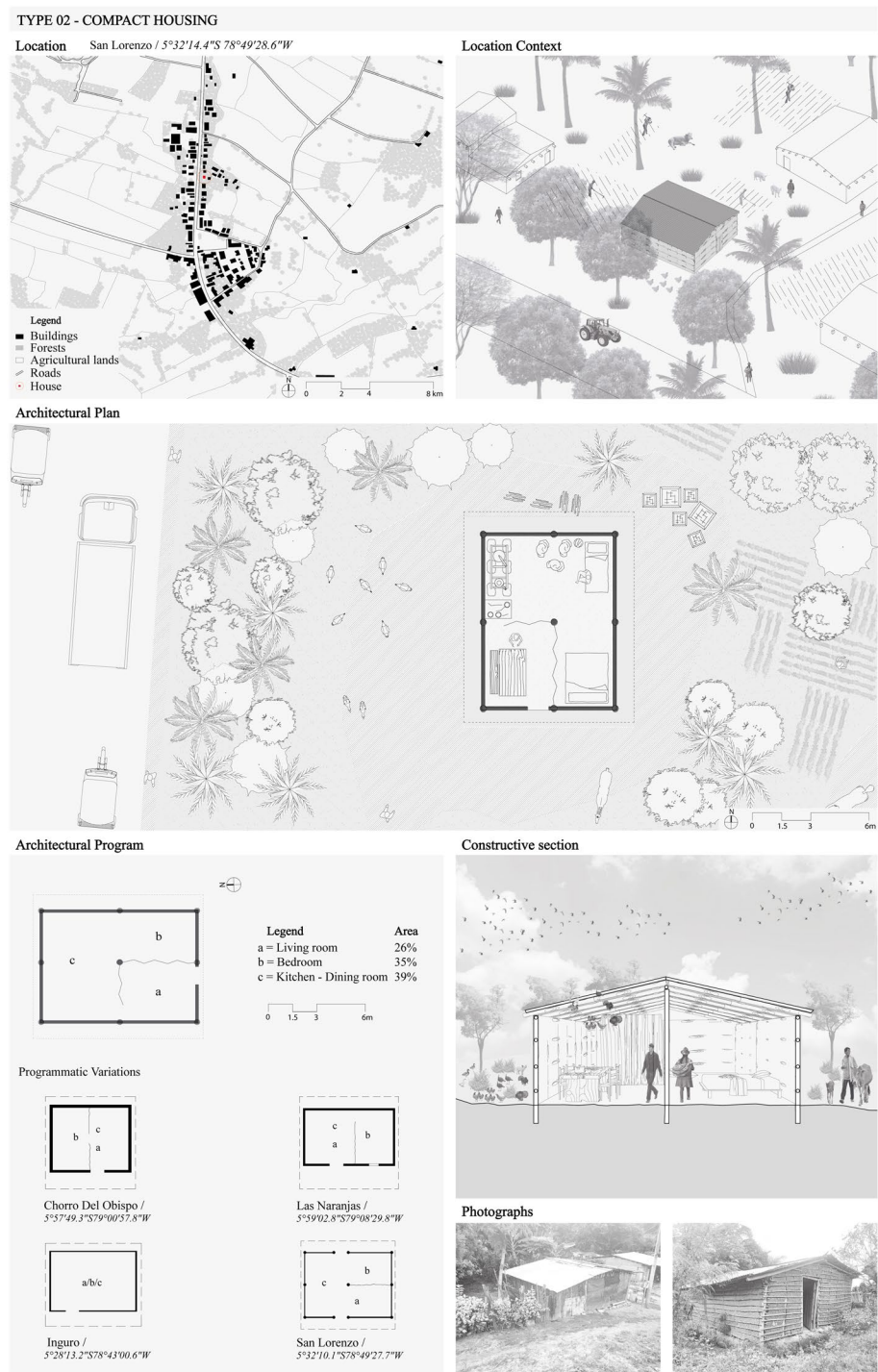


Fig. 3 Architectural characteristics of the compact housing type (Source: the author)

is used to store corn, wheat, beans, rice, and coffee. Through the roof, which receives the sun’s rays during the day, it is possible to have a higher temperature in the attic, making it possible to dry food such as cheese and meats.

In the Qullqa housing architectural type, one of the cultural manifestations practiced is the so-called “bar-ter” from the storage activities. This cultural practice consists of exchanging products between neighboring families between March and April (a season known

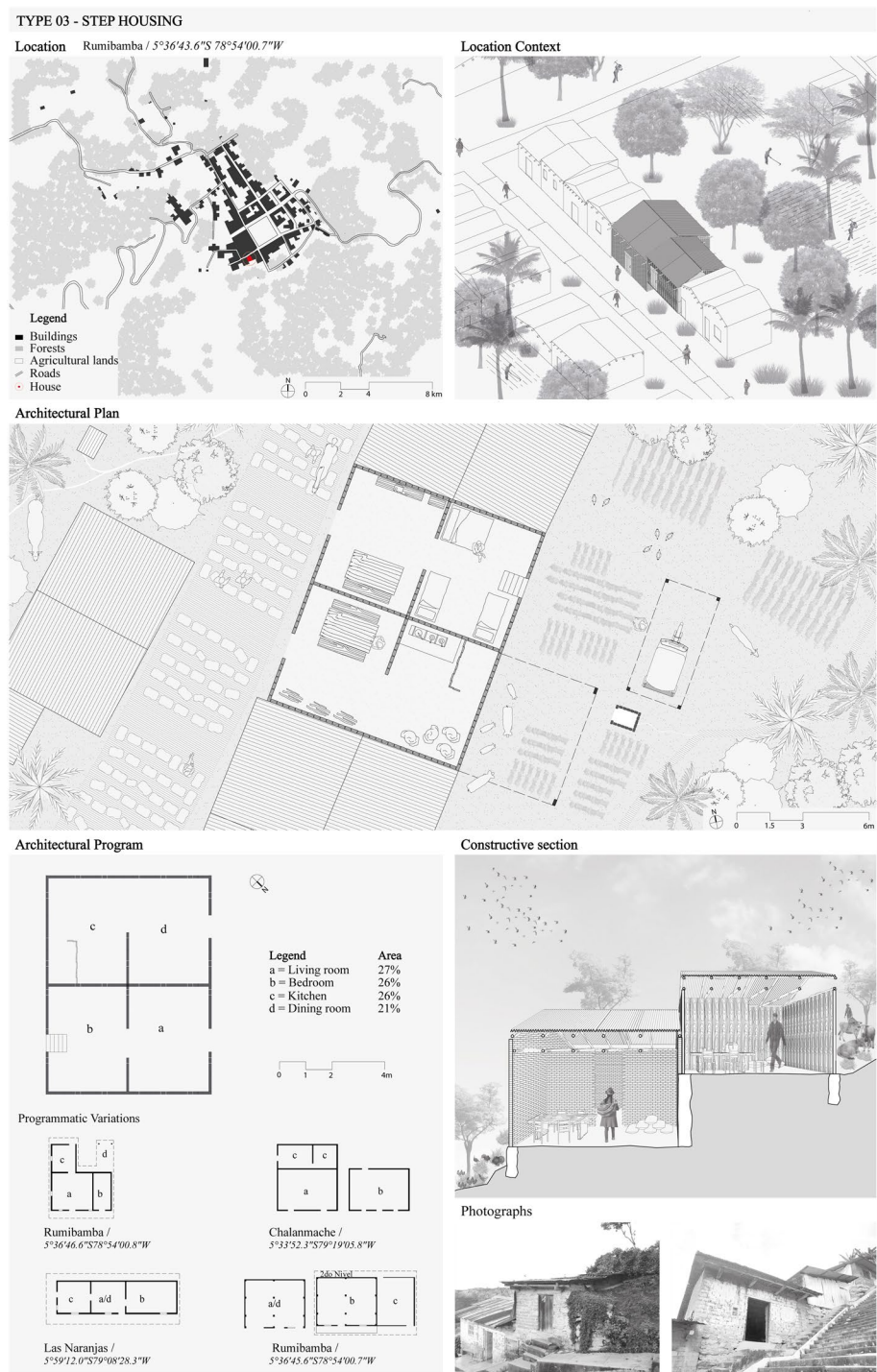


Fig. 4 Architectural characteristics of the “stepped” housing type (Source: the author)

as “famine”) because agricultural products are scarce. The construction of the attic area can be built with two types of construction processes. The first one using wooden planking (cedar, poplar, alder, and eucalyptus)

nailed to the beams, and the second one utilising “carrizo”, “guayaquil” or “caña brava” (local type of cane) tied with “quisque” (a type of local rope). The attic roof has an approximate slope of 35° to adapt to

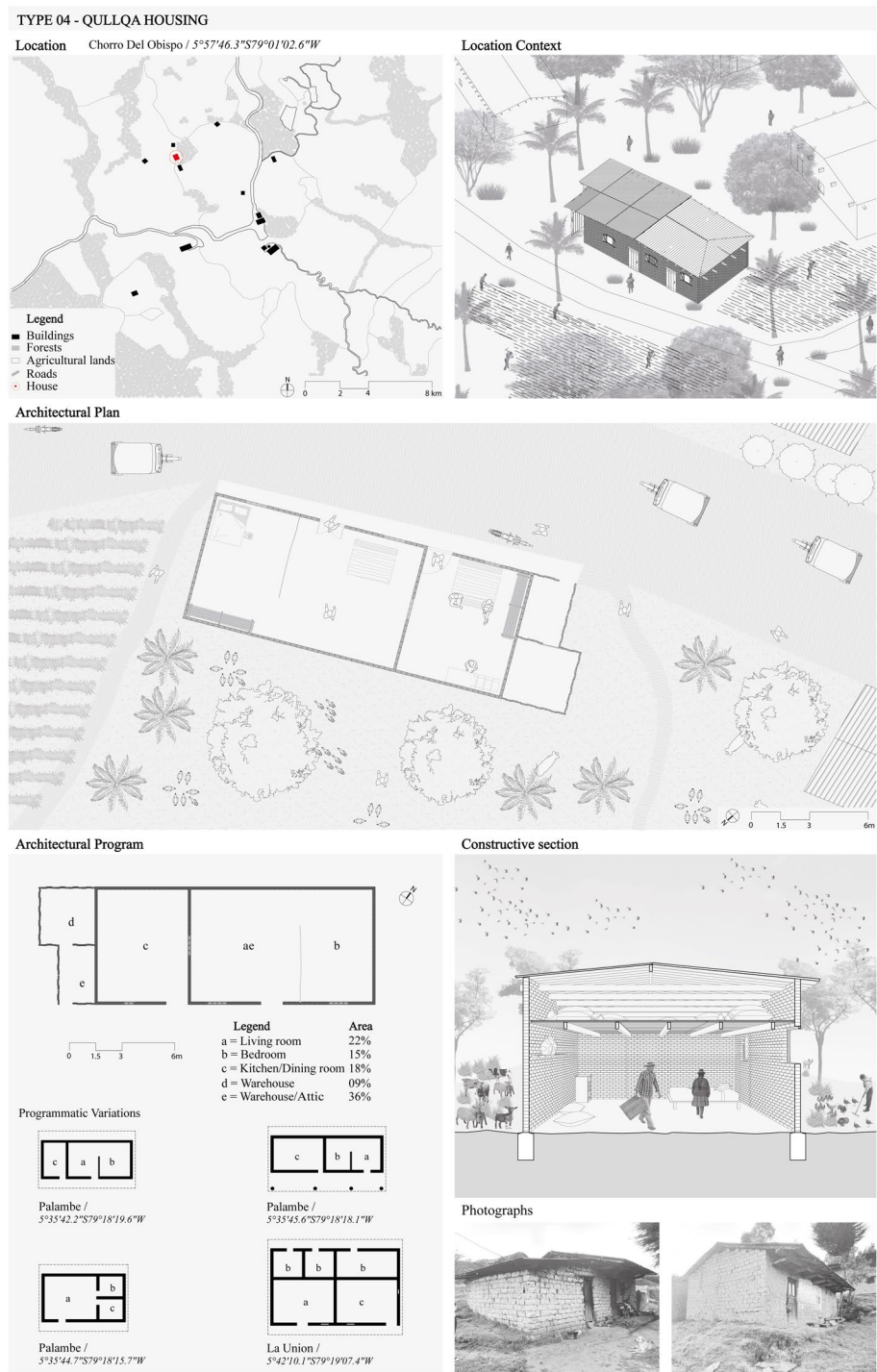


Fig. 5 Architectural characteristics of the “Qullqa” housing type (Source: the author)

climatological (frequent rainfall) and functional (food drying) factors. In turn, the roof structure is made of round wood for the joists and of “carrizo” or “caña brava” for the purlins, which is nailed to the calamine roof (Fig. 5).

3.2.2 Chacra housing

The term “chacra” is used locally to refer to agricultural fields and is derived from the Quechua word “chakra”. These housing units are built in a dispersed manner and are oriented to view the agricultural plots on very

steep topographic slopes (between 25° and 45°). This orientation is arranged to cover a greater visual range to safeguard the agricultural fields from animals (deer, mahogany, armadillo, parakeet, and parrots) that damage crops and harvests. On the other hand, this type of rural housing has an average built area of 17 m² to 20 m² with a floor-to-ceiling height of 2.80 to 3.00 m. The architectural program of these housing units consists of independent kitchen space and a multifunctional area where the living room, dining room, and storage room are located. This last space is used to store tools (“barretón”, picks, lamps, plows, yokes, and “barretas”) for agricultural use.

The “minga” is an essential cultural manifestation to consider when approaching the “chacra” rural housing. This cultural manifestation is carried out to celebrate the sowing, harvesting, and housing construction seasons. The “minga” consists of the preparation of traditional dishes (“mote”, tamales, “mashca” with cheese, tortilla, and stews) for the people who have collaborated in the agricultural work and the construction of rural housing. On the other hand, in the housing construction system, the walls are made of round wood, “carrizo”, “guayaquil”, and a set of recycled materials such as plastic and calamine. It is interesting to note that the use of traditional materials has changed over time. For example, the roof, which used to be covered with “Ichu” (local straw), is now made of industrialised material such as calamine. The “chacra” housing type has a life span of approximately five years. After this time, depending on the condition of their components, it is decided to demolish it or make partial changes to some of its structures, such as the roof (Fig. 6).

3.2.3 *Finca housing*

This architectural type of rural housing is called a “finca” to refer to an environment characterised by fruit fields and the development of animal husbandry activities. The land of this rural housing is located near water sources (canals, rivers, streams, and springs). In addition, the built area of the housing does not occupy the full extension of the land, but only the central part. This type of occupation is due to a strategy to facilitate the transport of the products harvested on the land to the housing. This housing type is developed with a floor-to-ceiling height of 2.50 to 3.00 m and an average area of 70 m² to 85 m². Likewise, two spaces stand out in the architectural program: the warehouse and the farm, which at the same time fulfill different functions throughout the year. In these environments, the activities developed are linked to the agricultural calendar and the festive seasons. Thus, the storage space is used for products from the farm (lime, orange, avocado,

mango, and tangelo). For the farm, the animals raised are governed according to the festive seasons. Thus, in September (Jaén Festival) and from November to January (Christmas and New Year), priority is given to the sale of animals such as chickens, turkeys, ducks, rabbits, guinea pigs, and pigs.

The construction of Finca rural housing is done by the users themselves with light materials from the riverbanks and springs, such as “carrizo”, “guayaquil”, and “caña brava”. The average construction time is 30 days, which can vary according to the dimensions of the housing. This construction has an approximate duration of five to six years where damaged parts of walls or roofs are replaced. On the other hand, its construction system is based on wood and “carrizo” or “guayaquil”. Likewise, in the farm spaces, the height of the fences is 1.00 to 1.50 m to obtain greater ventilation and easy feeding of the animals in a housing made of wood or cane. In addition, the bedroom walls are covered with plastic and calamine for privacy purposes. Likewise, the roof is generally of the “gable” type with an approximate slope of 20°, with a structure built in guayaquil, while the purlins are made of cane (Fig. 7).

3.3 Construction systems of rural housing in Jaén

3.3.1 *The adobe*

The adobe is a soil construction system used for building walls and is the most commonly used in rural housing in Jaén. To make adobe bricks, the soil is extracted from a clay quarry and then mixed with water and local straw (wheat stalk, “pajilla”, or “guayaquil” leaf). The mixture is left to rest for a week, then molded into bricks in the “gavera” (adobe mold), and then left to dry for 15 days in the sunlight. Then, using these adobe bricks, the walls are built, which are erected on the foundations, and a clay mortar accompanies the laying of the adobe. Once dry, optionally, a plaster of clay or cow dung is applied.

3.3.2 *The quincha*

The “quincha” is a construction system made of soil and cane and is used to a lesser extent in constructing walls in rural housing in Jaén. The “quincha” preparation begins with the assembly of the structure with reeds horizontally and wooden pillars arranged vertically to support the load of the roof and the tying of the reeds with “quisque”. Subsequently, cow dung or a mixture of mud and straw (“pajilla” and wheat stalk) is applied. In turn, the term “quincha” is understood by the population of Jaén as that division or wall made only of wood or cane placed vertically and tied with ropes of “cabuya” (local plant), without a covering of mud or any other material.

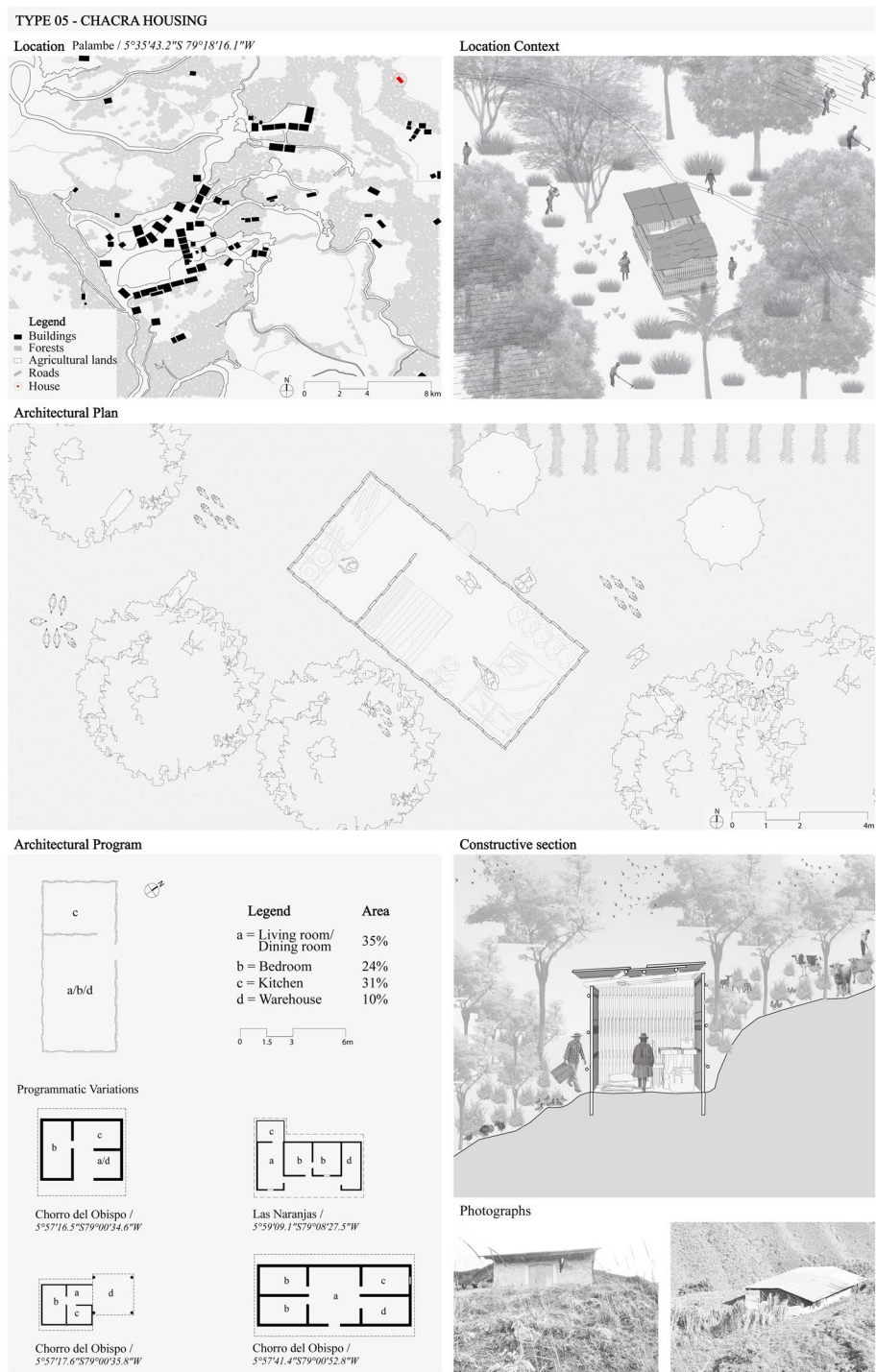


Fig. 6 Architectural characteristics of the “Chacra” housing type (Source: the author)

3.3.3 The Ichu

The “Ichu” has been the primary material used to make the roofs of housing in Jaén for the last five decades. This term refers to a grass-like plant native to the Quechua altitudinal

region. To make the “Ichu” roofing, it is necessary to collect it in the moorlands or scrublands and, in this way, form bunches of 50 to 80 cm. Likewise, once the construction of the roof structure is finished, the placement of the

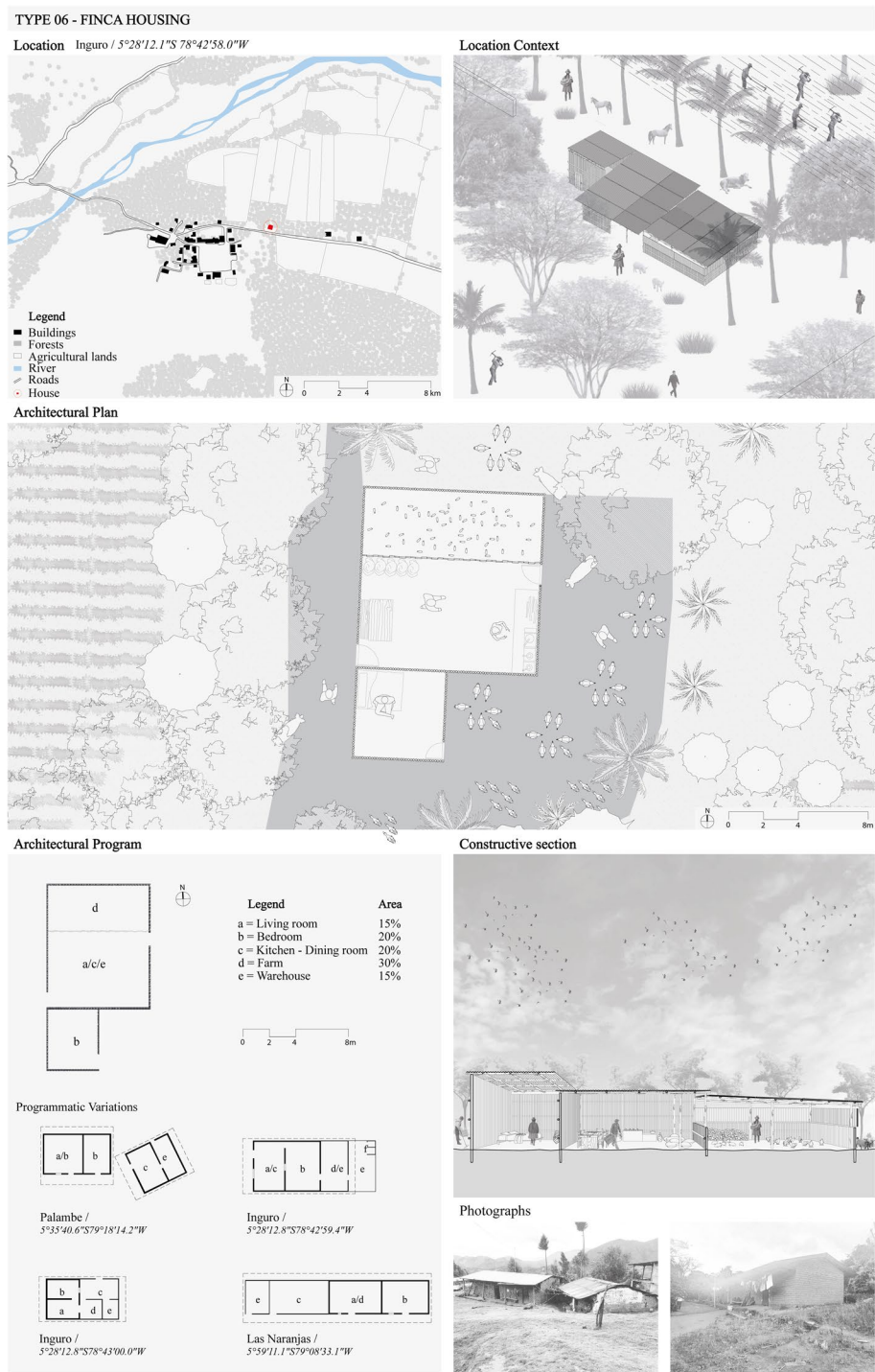


Fig. 7 Architectural characteristics of the “Finca” housing type (Source: the author)

“Ichu” bunches begins. These in the ridge part are placed with the plant root, while, in the rest of the structure, they are placed and tied in the straps of “carrizo” or “caña brava” with “quisque” rope. At present, the typical “Ichu” roofing

is no longer used because it requires constant maintenance (every three to five years), thus opting for the use of zinc sheeting, commonly called calamine, which is more durable over time and easy to install.

3.3.4 Foundations

There are three types of foundations used in rural housing in Jaén. The first type is the sinking into the ground of wooden structural pillars, at a depth of 50 cm, filled with stones of one inch in diameter and soil, and is common in one-story housing. Concerning the second type of foundation, this is made of cyclopean stone mixed with clay mortar and “pajilla” or wheat stalk at a depth of 60 to 80 cm. Likewise, the third type is the “pirca” leveling technique, which is developed in housing located on hill-sides. This technique consists of attaching stones with an approximate diameter of 30 cm without using mortar to create a rigid base and, at the same time, a retaining wall.

3.3.5 Balcony

This space is conceived with the function of a viewpoint and as a place to hang clothes. The balcony is present in the two-levels housing and is built by extending the beams on the facade (1.50 m wide). A wooden floor planking or cane rests on these beams, which are nailed or tied (“cabuya” braid). The finish of the balcony is generally basic, employing timber and without the implementation of a parapet (Fig. 8).

4 Discussion and conclusions

The results show that there are two groups and six types that represent rural housing in Jaén. The variables in common are location, architectural program, housing culture, and construction system. Concerning the location, this originates from strategies based on location in the topographic environment, the presence of water sources, and climatic factors. On the other hand, the architectural program is summarised in four spaces: living room, kitchen-dining room, bedroom, and animal care area.

Rural housing in Jaén is located in valleys and hillsides, on the condition that there is a water source nearby, such as rivers, or that it is possible to collect water through pipes, canals, or irrigation ditches for consumption and agricultural activities in the fields. Another characteristic in Jaén, concerning the location, is the orientation of the housing. This orientation is directed towards the crop fields in the highest part of the land to acquire a greater visual range to safeguard the crops from the animals.

The architectural program of rural housing in Jaén increases with time, the family nucleus, customs, and types of use. Likewise, the spaces are related to agricultural and domestic work, highlighting the leisure activities practiced during certain day hours, thus developing an additional space to perform them. Likewise, seasonal spaces are habilitated in rural-agricultural housing in Jaén, linked to the agricultural process, storage, animal husbandry, and commerce.

Rural housing in Jaén is characterised by using construction techniques such as “pirca”, “quincha”, and wood/cane using materials such as soil, wood, “guayaquil”, “carrizo”, and stone. Construction customs are produced by applying indigenous knowledge of their context through traditions among the inhabitants such as the “minga”, “pararaico”, and the “cambio de fuerzas”. The latter is generated for economic and cultural reasons. The customs and traditions that impact the conception of Jaén housing are the “cambio de fuerzas”, which is the most practiced in the field of construction (raising the housing) and crops (planting and harvesting). On the other hand, rural housing in Jaén in the last five decades has contemplated several variations in the constructive aspects and materials, replacing some local materials such as “Ichu” for calamine.

The differences found in the two groups of rural housing are related to the time of construction. Rural-residential housing stands out due to the complexity and number of floors developed, with a longer construction process. On the other hand, rural-agricultural housing uses materials such as wood and cane and takes less time to build. Another characteristic that differentiates rural-agricultural housing from rural-residential housing is the importance given to the use of storage space. Finally, the time spent in the housing is differentiated by the agricultural and domestic activities carried out in the local context. Wherein the rural-residential housing, due to the family composition, there is a constant use during the day, while in the other group of housing, the time spent in the dweller's home is during the afternoons and evenings due to the continuous work in the fields (Fig. 9).

Jaén does not currently have a specific plan for preserving the cultural practices of its vernacular dwellings; however, there are municipal strategies for preserving and promoting the customs and festivals that give the territory its identity. Jaén's municipal urban development plan includes objectives such as promoting cultural identity and its different manifestations, as well as implementing territorial articulation and equipment. The latter prioritises managing the occupation of the territory and leading the processes of urban and rural development. Jaén's development plan only refers to built heritage when mentioning archaeological remains and highlights the “absence of local policies for cultural promotion and conservation” (MPJ 2013, 71). We believe that in order to achieve conservation policies for the vernacular dwellings that we have addressed in this study, it is essential to associate the buildings to their culture and territory. This will allow us to understand the whole as a cultural landscape that according to Peruvian legislation could be feasible to more concrete conservation policies.

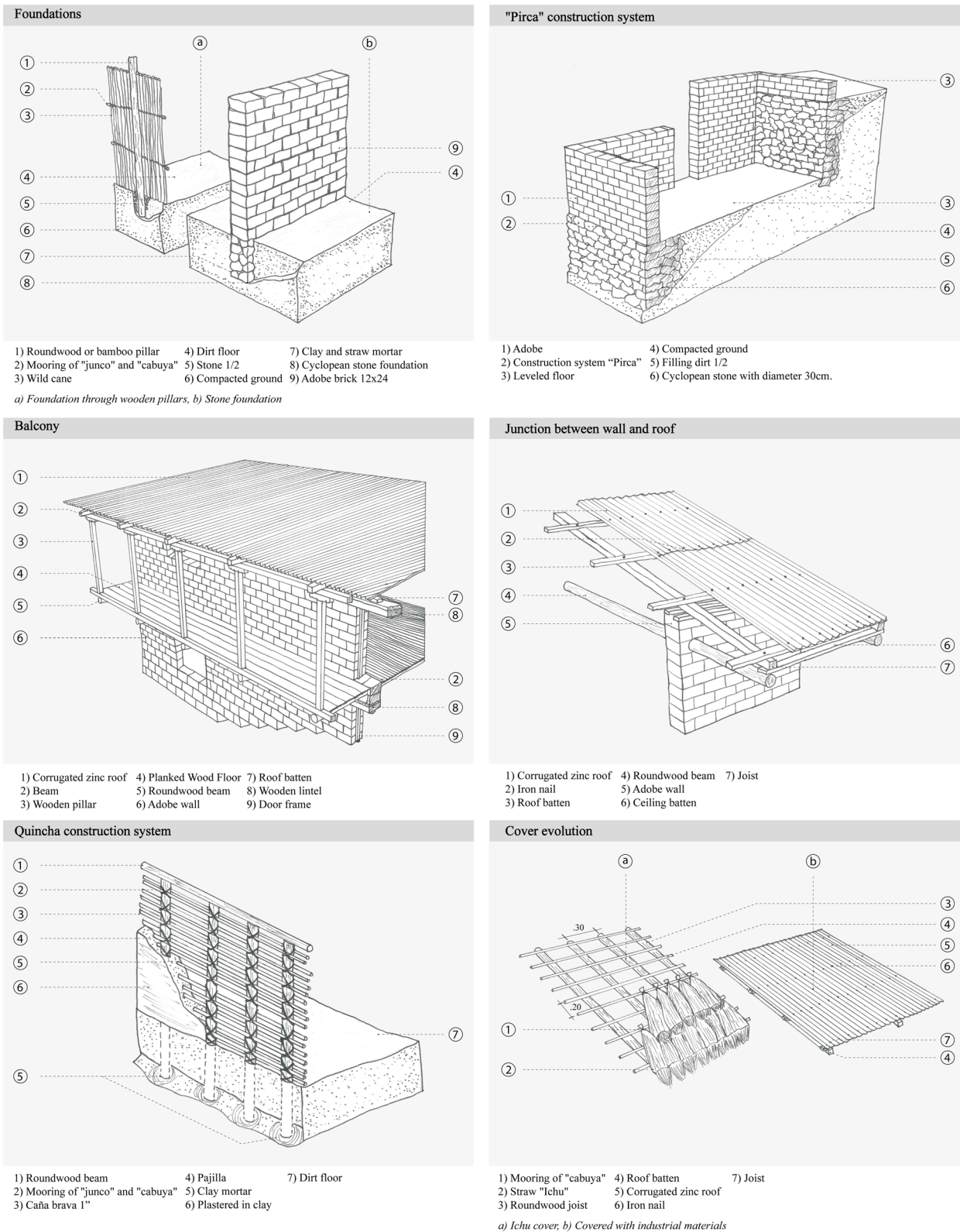


Fig. 8 Construction details of rural housing in Jaén. (Source: the author)


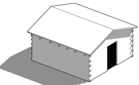


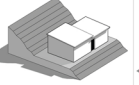
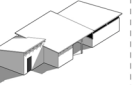









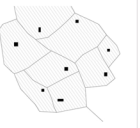
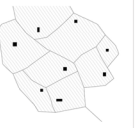
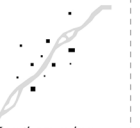
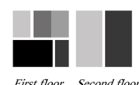

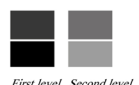



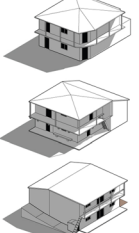
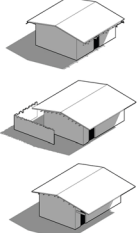
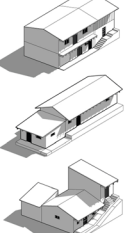
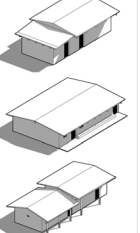
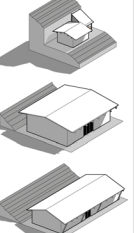
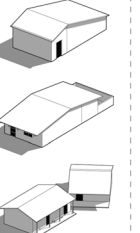

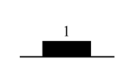

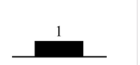

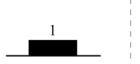






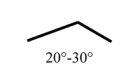
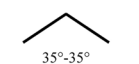
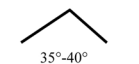
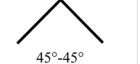
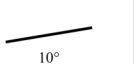
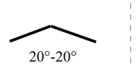






Group: Rural-residential housing				Group: Rural-agricultural housing		
Indicators	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Types	 Expanded housing	 Compact housing	 Step housing	 Qullqa housing	 Chacra housing	 Finca housing
Altitudinal regions	 Fluvial Yunga Quechua	 Rupa-rupa Quechua	 Fluvial Yunga	 Fluvial Yunga Quechua	 Rupa-rupa Fluvial Yunga Quechua	 Rupa-rupa Fluvial Yunga Quechua
Types of location	 Location in populated center	 Location in populated center	 Hillside location	 Location on agricultural plot	 Location on agricultural plot	 Location near river
Programmatic scheme	 First floor Second floor	 First floor Second floor	 First level Second level	 First floor Second floor	 First floor Second floor	 First floor Second floor
Variations						
Family composition	• Extended family	• Nuclear family	• Nuclear family	• Nuclear family	• Family without children	• Nuclear family
Rural activity	• Farming • Animal husbandry • Storage • Commerce	• Farming • Animal husbandry • Storage • Commerce	• Farming • Animal husbandry • Storage • Commerce	• Farming • Animal husbandry • Storage • Commerce	• Farming • Animal husbandry • Storage • Commerce	• Farming • Animal husbandry • Storage • Commerce
Number of floors/levels	 2	 1	 2	 1	 1	 1
Building orientation	 N	 N	 N	 N	 N	 N
Roof slope	 20°-30°	 35°-35°	 35°-40°	 45°-45°	 10°	 20°-20°
Ventilation	 Crossed ventilation	 Single opening	 Crossed ventilation	 Single opening	 Single opening	 Single opening
Windows area	5.50%	0%	0%	3.60%	0%	0%
Construction system	Adobe	93%	5%	67%	86%	25%
	Quincha	-	70%	-	-	-
	Wood	5%	35%	33%	14%	75%
	Bamboo/cane	2%	-	-	-	33%

Fig. 9 Architectural types of rural housing in Jaén (Source: the author)

In Peru, the Directorate of Cultural Landscape (DPC), attached to the Ministry of Culture (MINCUL), is the agency that recognises cultural landscapes as human constructions, aesthetically recognizable, and related to buildings and ornamental ensembles. In order to achieve that delimited geographic spaces in Jaén become cultural landscapes, it is necessary to characterise and support the territorial dynamics that shape the space (use and management of space, relevant historical events, and occupation processes), physical-geographical characteristics, and the existing cultural heritage (MINCUL 2011). All the cultural landscapes catalogued in Peru have different cultural characteristics, rituals, and territories (MINCUL 2020). One of them that is worth highlighting due to its territorial and economic similarity with Jaén (Peruvian highlands) is the Sondondo Valley, one of the most unique productive areas in the southern highlands of Peru (DPC 2017a). The inhabitants of this valley built a system of terraces adapted to the topographic and climatic characteristics of the environment to expand the agricultural frontier. There are also millenary dances, cultural manifestations, and pre-Hispanic productive practices in the community. Another study worth mentioning is about the houses of Cangallo, also located in the Peruvian highlands (DPC 2017b). In this territory, evidence of occupation is associated with productivity such as terraces, canals, and corrals. There are also material expressions of colonial and republican infrastructure such as churches, chapels, and mansions. The rural geographic environment and the organisation of the houses in Cangallo establishes common characteristics of the organisation of the family houses in relation to their rural environment, such as proximity to water, calamine roofs, adobe construction, the family garden, and the agrarian landscape (DPC 2017b, 11–29). Finally, there are also academic and governmental efforts that promote the conservation of rural housing, such as the Methodological Guide for the Conservation of Earthen Constructions (MINCUL and PUCP 2019). This guide establishes guidelines for considering earthen constructions as built heritage. It also includes strategies for improving housing for rural habitat in the face of climate change; earth construction techniques and quincha walling techniques, as in the case of the houses in Jaén.

During the research, the rural populated centres were cataloged using a database provided by the National Institute of Statistics and Informatics (INEI) with information on population, location, natural region, and name of the populated centre. In this process, a filter was made with the parameters that characterise rural populated centres according to INEI. Subsequently, in the georeferencing stage of the rural populated centres, outdated and erroneous data on the location was found, which was

corrected with field visits and the collection of coordinates to update the database in *ArcGIS*. Finally, with the processed and updated information, the routes and times of analysis in the populated rural centres were plotted by altitudinal floors, number of housing, and population.

In light of this research, it is recommended that local public sector institutions integrate the characteristics of rural housing in Jaén into their territorial management and planning. This through parameters that directly involve rural housing in future cadastral projects and rural diagnoses, understanding the relationship between the inhabitant and the housing. Likewise, it is suggested that the academic sector incorporate rural housing in the architecture schools through a subject in the study plan for greater relevance in the Academy and avoid remaining only as a project workshop study. Also, in further research, to address or improve for a better understanding of the variables related to the emplacement, the architectural program, the culture in the way of living and construction systems.

The development of the research has determined the existence of six types of rural housing in Jaén. These housings have been contrasted through the following variables of analysis: location, architectural program, culture in the way of living, and construction system. Thus, the types of rural housing in Jaén are categorised into “rural-residential housing” and “rural-agricultural housing”. Rural-residential housing shares characteristics related to the customs in the way of building and living. In addition, it stands out for its location in the topography, varying from 5° to 50°, responding to the climatology such as heavy rains, floods, and temperature. On the other hand, rural-agricultural housing stands out for having a greater focus on the agricultural sector, reflecting the location within the crop fields, dedicated to spaces within the housing for products and animals. Likewise, customs related to the agricultural calendar and housing stand out. That is why the factors that properly characterise each type of housing are the activities, customs, and types of use. Therefore, the rural architecture present in Jaén is conceived in an autochthonous and traditional way. Finally, with this information, it is possible to understand the variety in Jaén, evidencing the rural architectural wealth and the multiple types in the national scope. Therefore, it is recommended that similar studies be carried out to value our rural architecture.

Authors' contributions

FP conceived and designed the research, collected the data, performed the analysis, and wrote the paper. DS conceived and designed the research, contributed analysis tools, performed the analysis, and wrote the paper. CY conceived and coordinated the study, contributed analysis tools, performed

the analysis, and structured the manuscript. All authors read and approved the final manuscript.

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Declarations

Competing interests

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