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SPATIAL AND ARCHITECTURAL ANALYSIS OF RURAL SETTLEMENTS: A CASE STUDY OF VERNACULAR ARCHITECTURE IN THE CHHANTYAL VILLAGE OF GURJA KHANI, DHAULAGIRI, NEPAL

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Abstract

The vernacular settlement of the Chhantyal community in Gurja Khani village, located in the Dhaulagiri region of central-western Nepal, remains vibrant and continues to reflect the socio-cultural heritage, historical continuity, and sustainable lifestyle of this rural society. This study offers a comprehensive analysis of Gurja Khani, examining its geographical context, settlement patterns, community structure, clustered housing arrangements, social organization, and ritual practices. The research identifies and categorizes three primary dwelling typologies based on their morphological development and functional characteristics: (1) the original form of dwellings, (2) evolved forms with extended porches, and (3) dwellings exhibiting variations in form and number of storeys. These typologies are analyzed in relation to construction techniques, spatial organization, and community usage of open spaces, both within and around the dwellings. The integration of building materials and construction methods with the local terrain and climatic conditions demonstrates an adaptive architectural approach, resulting in a settlement that is ecologically responsive and socially cohesive. This vernacular architecture not only sustains traditional lifeways but also embodies the identity and collective memory of the Chhantyal community and their place in the landscape.

Keywords: Vernacular architecture, Rural Settlement, Chhantyal community, Dwelling typologies, Indigenous construction techniques

1. Introduction

Vernacular architecture represents the accumulated wisdom of generations in adapting to local climates, geographies, and socio-cultural needs. In regions with complex terrain and diverse ethnic traditions, such as the Himalayas, vernacular settlements are not merely places of residence—they are deeply embedded expressions of community identity, environmental adaptation, and intangible heritage. Nepal, with its dramatic ecological gradients and over a hundred formally recognized ethnic and caste groups, exhibits an extraordinary range of settlement forms and construction practices.

Among these, the Chhantyal community in Gurja Khani, a remote village in the northwest corner of Myagdi district in Gandaki province of Midwest Nepal, routed to Gurja Himal (7193m), at the south of the ridge formed by the chain of snow peaks- Dhaulagiri I to IV in the Dhaulagiri range (Fig. 1), presents a compelling case of architectural resilience and cultural continuity. The village being situated at the far end at the lap of the Himalaya, a saying goes- "there is no point above the hair tuft, and no village further up that than Gurja".

In the new administrative division of the country, the village belongs to Ward 1 of Dhaulagiri Rural Municipality,

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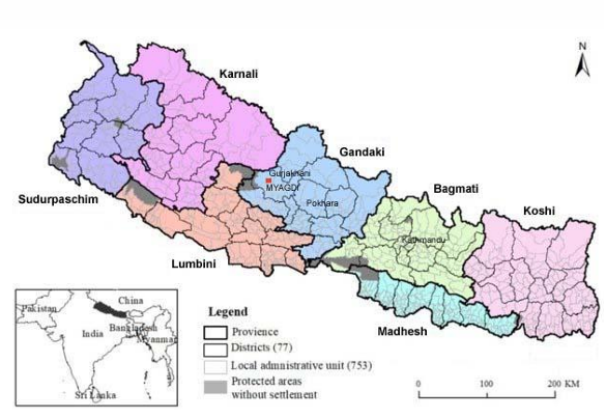

Figure 1: Location of Gurja Khani in Myagdi district

and Gurja Khani is the only human settlement within the territory of the ward occupying an area of about 200 sq. km that ranges from 2400 m at the valley basin to the snowcapped mountain ridges of 8000 m. The nearest village from Gurja is situated at a distance of one day walk, and the trail has to cross a high altitude pass of 3200 m towards east, the main communication corridor with the outside world, and of 3800 m towards southwest that leads to the Dhorpatan Hunting Reserve at west (Fig. 2). The major communities of the village are of Chhantyal (70%) and Vishwokarma. Chhantyals are listed in the register of indigenous community of the country under 'National Foundation for Upliftment of Aadibasi/Janjati Act, 2058 (2002)'.

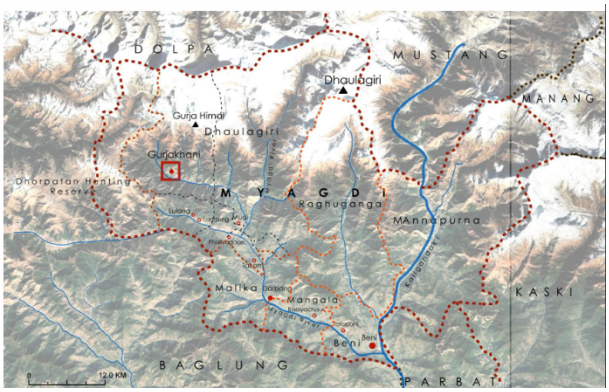

Figure 2: Rural Municipality in Myagdi, Gurja Khani, ward-1

Gurja Village is known as the largest settlement of Chhantyal community with 257 households and a population of 1508 covering an area of 338.66 sq. km as listed in the report 'Dhaulagiri Municipality- Objective account, 2074-75'. This survey (Fig. 3.) covered only 200 households which covers 70% Chhantyal community and rest of the households is Vishwokarma (Bika) with one of Pariyar community within 200 sq. km area.

Most of the settlements have suffix 'khani' in their respective village name. This way the history of traditional occupation of Chhantyal is connected to mining. The village names are so called because people who explored copper and iron mines and worked in mining as their primary profession settled in these areas around which potential mine sites were discovered. Gurja village is also known as Gurja Khani and a report (Chhantyal, 2020) lists the mining sites located around the village territory.

Despite Nepal's growing body of ethnographic and architectural studies, especially in regions like Mustang and Dolpo, the built environment of the Chhantyal people remains largely undocumented. This research addresses that gap by focusing on the construction techniques and dwelling typologies found in Gurja Khani, exploring how they reflect the community's adaptation to the harsh mountain environment and their socio-cultural values.

2. State of Research

The diversity of topography, climate, and culture across different geographic regions has shaped distinct forms of human settlements and dwellings, which over time have come to define the identity of both the place and its people. In Nepal, where ecological settings vary dramatically, this diversity is reflected in the social and cultural composition of the population. According to the Central Bureau of Statistics (Government of Nepal, National Planning Commission Secretariat, 2014), the country is home to more than one hundred formally identified ethnic and caste communities. Similarly, The Nepal Atlas and Statistics (Harka Gurung, 2006) records 41 ethnic communities with populations exceeding 5,000, most of which are concentrated in particular geographic regions.

Systematic studies of Nepal's ethnic communities began in the 1950s through anthropological research. Dor Bahadur Bista's Peoples of Nepal (1967) offered a foundational overview of about thirty ethnic groups. Later works, such as Blair's 4 Villages: Architecture in Nepal (1983) and Toffin's Man and His House in the Himalayas (1991), explored the social and architectural characteristics of diverse communities across Nepal. Subsequent research has focused largely on Mustang and Dolpo, with contributions from history, anthropology, and architecture (Kleinert 1973; Gutschow 1994–2003; Ramble 2008). Despite these advances, studies on many other regions and ethnic groups remain scarce- the architectural and cultural practices of other communities, such as the Chhantyal, remain understudied. This gap underscores the need for research that documents and analyzes the vernacular architecture and construction techniques of lesser-known communities in geographically challenging environments like Gurja Khani.

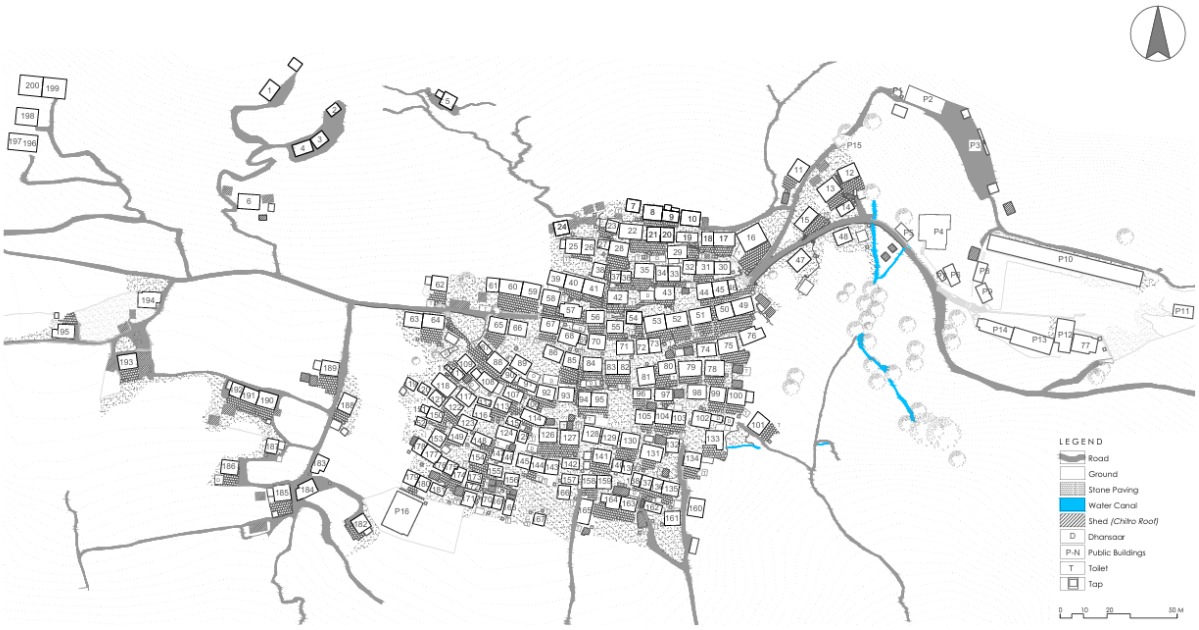

Figure 3: House code plan

Figure 4: View of Gurja Khani village from northern hill

Figure 5: Aerial view of the core settlement

As Nepal stands at a transformative juncture, with rapid changes visibly affecting rural vernacular landscapes, such documentation has become both urgent and historically significant

3. Methodology

The province authorizes rural municipalities to prioritize projects related to infrastructure (roads), education (schools), health (hospitals and health posts), and agriculture. However, initiatives in the cultural sector have yet to be identified. This is gradually changing with the growing recognition of cultural heritage -including music, dance, and architecture as vital community assets. Architectural surveys play a key role in this process by documenting vernacular architecture, fostering awareness, and encouraging local communities to value and preserve their heritage. The research is mainly base on field surveys, interviews with local inhabitants, photographic documentation, mapping, measuring the buildings, arability of building materials and construction techniques and typological analysis.

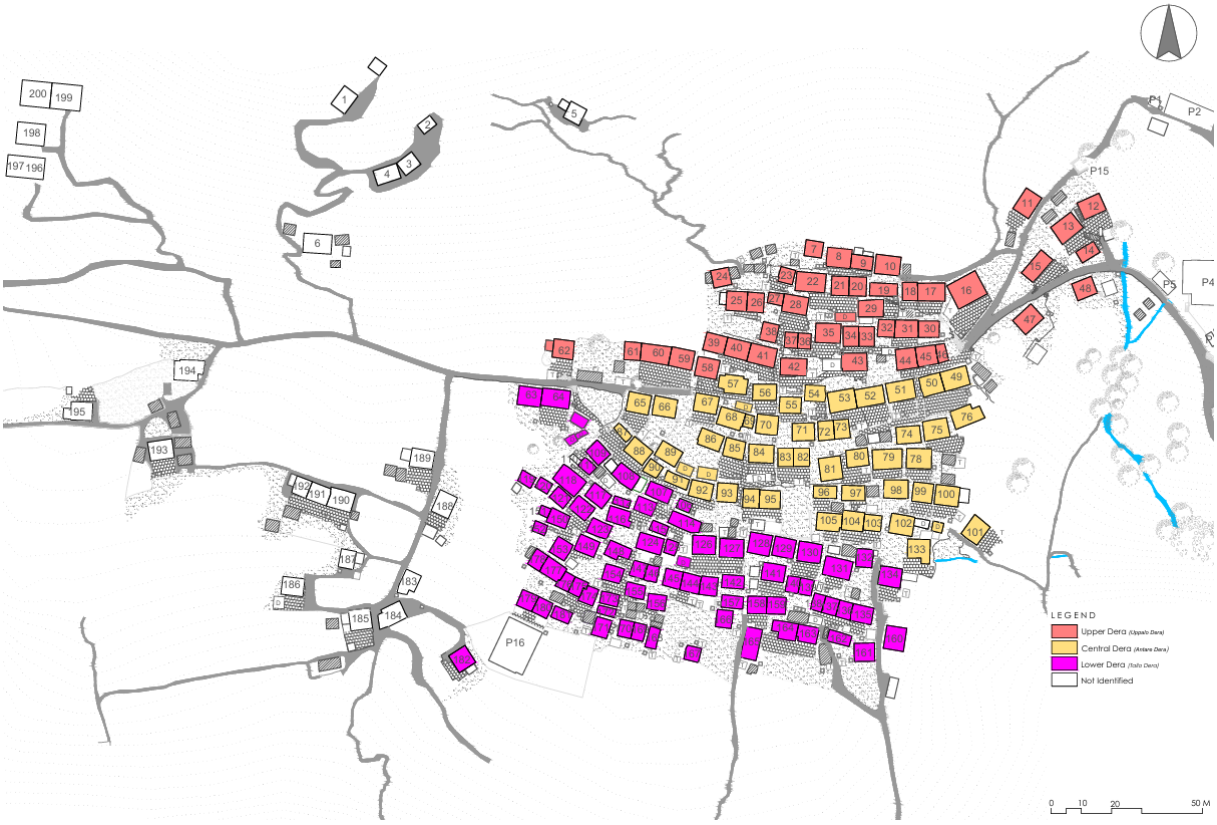

Figure 6: Dera division plan

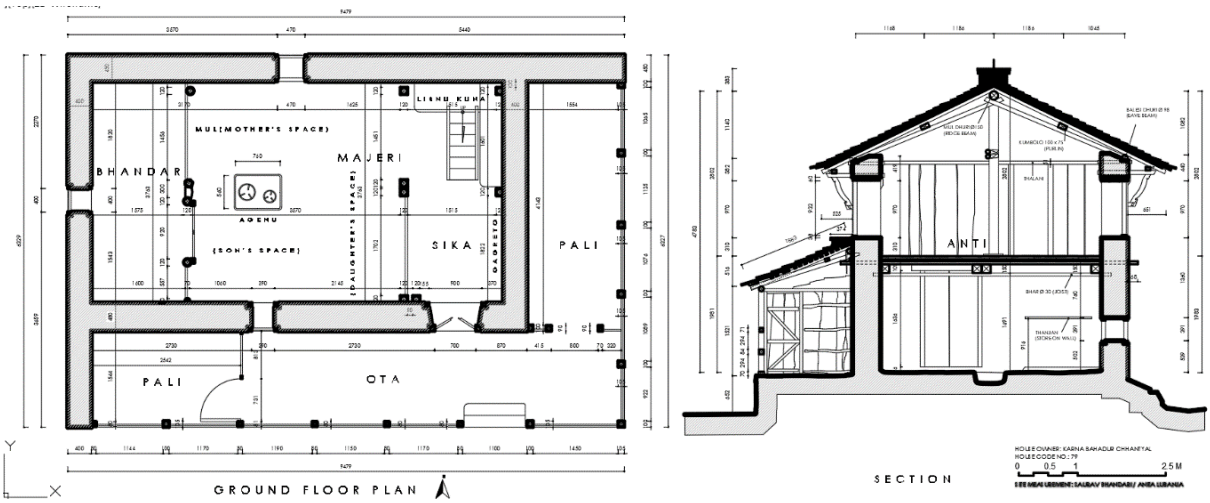

Figure 7: Plan and section showing different spaces and dimension in Karna Bahadur Chhantyal's House Code No. 79

4. Settlement and Dwelling

4.1. Settlement pattern

Gurja Khani village, located at an elevation of 2,600 meters, lies on the western slope of a hill above the Gurja River. The settlement extends about 1.5 kilometers east-west, occupying the relatively flat western section of the terrain. Facing south and open to both east and west, the village receives sunlight from morning until sunset behind the nearby snow-covered mountains (Fig. 4).

Although, Gurja Khani, at 2600 m altitude, experiences

Figure 8: A central post near sikamajeri partition

Figure 9: Interior layout arrangement

strong solar radiation that raises summer daytime temperatures up to 33 °C. From November, mornings and evenings become cooler, with winter days below 10 °C and dawns reaching -5 °C. A hill behind the village blocks cold northern winds, though evenings cool with western breezes. Between June and August, Gurja receives about 1100 mm of rain and some winter snowfall, which has decreased in recent years due to global warming.

The village dwellings are densely clustered in horizontal east-west rows, forming uniform ridge and eave lines separated by front yards. About 200 houses occupy an area of roughly 130 m by 130 m, giving a high density of about 96 m² per dwelling-comparable to urban areas (Fig. 5).

The rows follow the gentle terrain contours, with south-facing façades and broad front yards that also serve as connecting pathways. In Fig. 6., two north-south lanes divide the settlement into three parts-upallo dera (upper), antare dera (middle), and tallo dera (lower). Few stone walls exist; most homes open directly to neighbors, reflecting a close-knit community. The Chhantyal community's two main clans -Bhalanja and Tathabja are concentrated in the east and west of the upper and central areas, respectively, while the Vishwokarma group resides in the southwest. Within clans, family members' houses stand side by side or share party walls, maintaining uniform building lines and ridge heights. Typically, 3-4 connected houses with continuous verandas and long front yards forms the characteristic village scene.

4.2. Dwelling Layout

Most Gurja houses have two floors—a ground and an attic–with only a few one or three-story buildings. All face south with a spacious front yard and a raised veranda (ota). The main door opens into a small foyer (sika), leading to the main living room (majeri), divided by a low wooden partition. Spaces like gagreto (for water pots), dwar-kuna (for cleaning tools), and lisnu kuna (with a ladder to the attic) are arranged around the foyer. The hearth (agenu) sits on the west wall of the majeri, enclosed by thick stone walls.

In Gurja houses, the central room is organized along an east–west axis formed by three main posts, with the western post beside the fireplace serving as the main pillar (mul khanbo) - a symbolically significant element used in rituals like Dashain, weddings, and ancestral worship. The post near the entry from the sika is often decorative for visual emphasis. The southern wall typically has wooden boards and shelves for utensils, while additional shelves may appear on the northern and western walls. The majeri space centers around the hearth, where the northern (upper) side is for the mother or parents, the southern (lower) side for sons, and the eastern side for daughters, reflecting both spatial and familial order (Fig. 7).

Above the fireplace, purlins are suspended from the joists by strings to hold trays used for drying grains, vegetables, or meat. Some houses have a western room (bhandar) beside the fireplace that serves as a shrine for clan ancestors and a storage space for wine, beer, and wooden trunks.

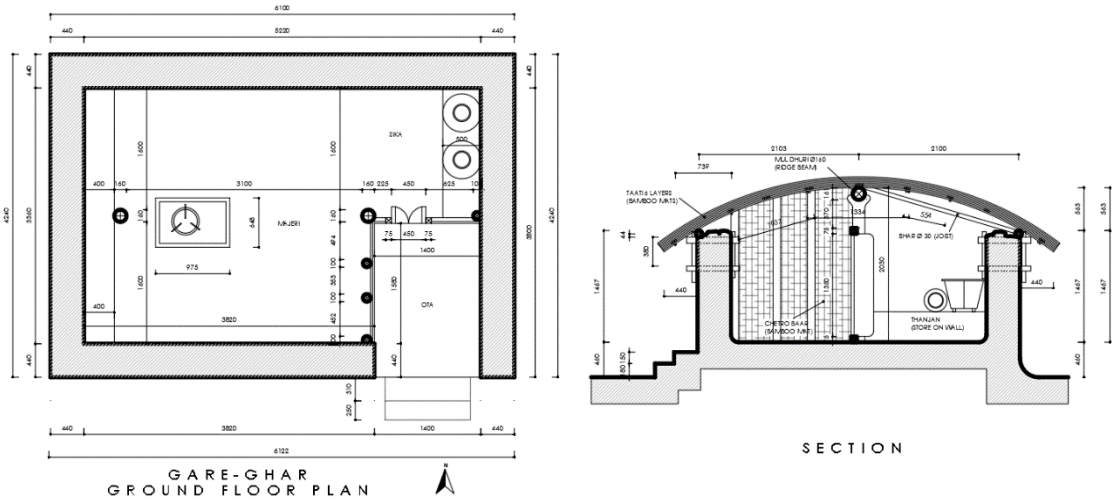

Figure 10: Plan and section of a reconstruction of earlier Chitre-ghar (bamboo mat house) later change to Gare-ghar

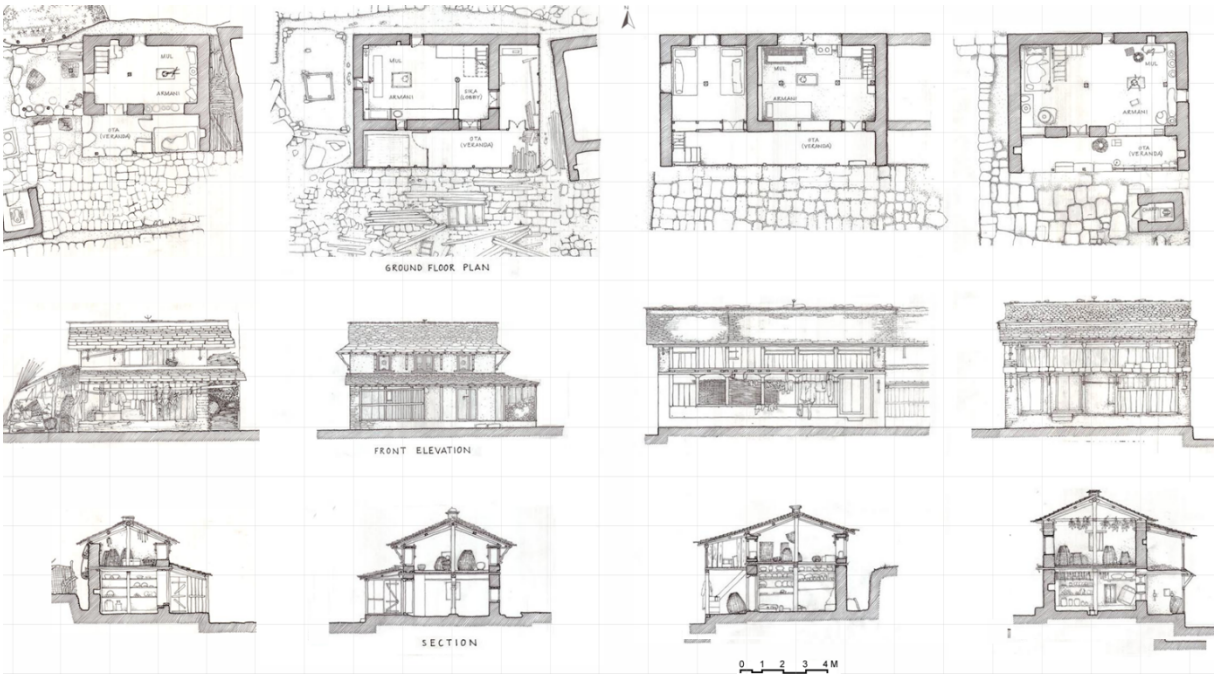

Figure 11: A sample of dwelling types and their variations

The partition between this sacred room and the majeri may be made of wood or stone. On the eastern side, certain houses include another room accessible from the ota or, occasionally, from the sika inside. Wealthier and older houses often feature a long southern ota with a side room called pali to the east—commonly found in the upper village area. According to Harichan Chhantyal, some Chhantyal houses have pali on two or three sides, called two-pol and three-pol houses respectively, though in Gurja most are one-pol houses with a single pali. The upper floor, called anti, is mainly used for storing grains, bamboo baskets, and farm tools like ploughs and spades. After the harvest, rituals are performed with grain puli, cloth banners, incense, and oil lamps. The southern wall has two windows and a central shelf, with one window providing access to the lean-to roof. Some houses have a veranda above the ota, often fenced with wooden railings and accessible from the ground floor or interior stairs, a design more common in newer houses.

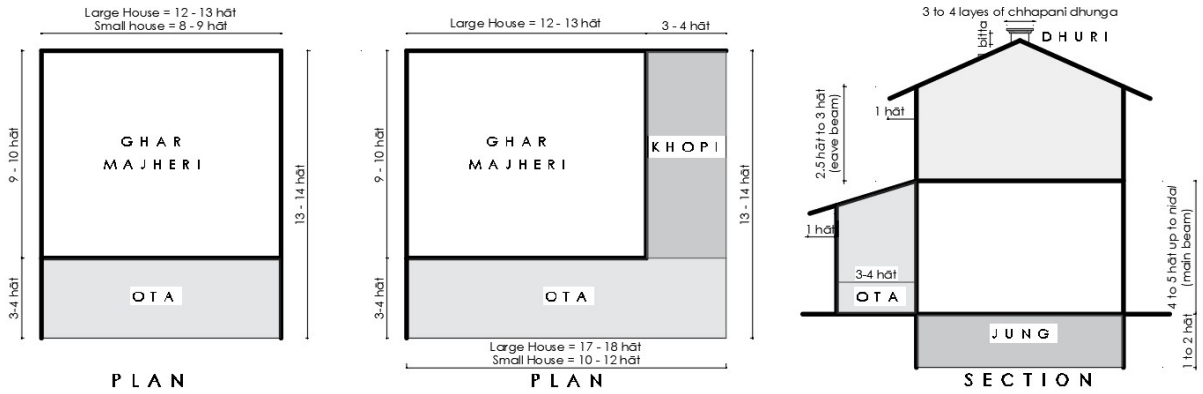

Figure 12: A traditional measurement units in building-illustrations

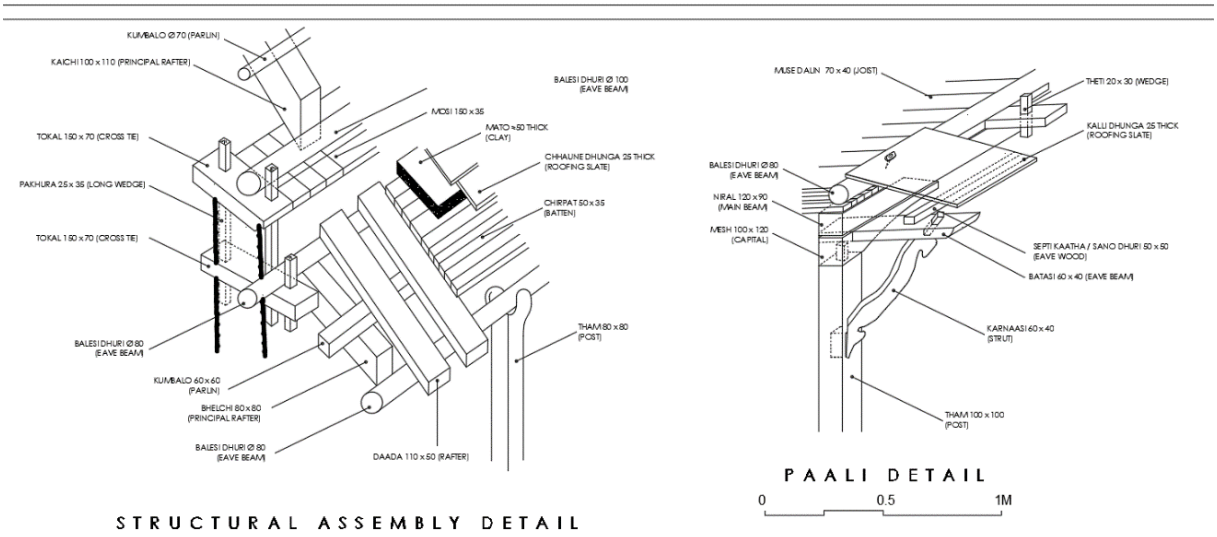

Figure 13: Structural assembly detail

In the dwelling area, auxiliary structures such as firewood sheds (daura-vas) and attic sheds (thada or iram) serve as cattle shelters below and firewood storage above. These are temporary timber-frame structures with bamboo mat roofs. In Gurja, cattle typically stay in alpine pastures most of the year and are brought to village fields only during winter, while a milk cow may be kept at home for daily needs.

4.2.1 Original form of dwellings

According to Mr. Dhan Bahadur Chhantyal who is now 50-year-old, lived in Chitre-ghar with his parents in a family of 8 members till 1990. The original form of dwelling, Chitre-ghar is built of timber frame lashed with bamboo splinters or rope with layers of bamboo mats spread in the vault shape roof. The timber post is usually of forked tree trunk or its branch. The side wall is also of bamboo mat with mud plaster and is of around 1.40 m high. One can stand free at the central part under the ridge. It is said that, with three layers of bamboo mat, the sloped roof doesn't leak. However, one often finds more than three layers due to the addition of new mats in later years. In Chitre-ghar, there was not ota–the veranda, in the ground floor. However, a foyer, called pali, to enter the interior of the house is carved out at the southeast end from the main body of the unit itself. Through the main door in the foyer, one enters to a small space comparable to the sika, and then at left is the main space—majeri, of the house. There are no other rooms beside these three spaces. In our reconstruction survey of one of such unit, the size of the house is humble—of around 6.1 m x 4.2m.

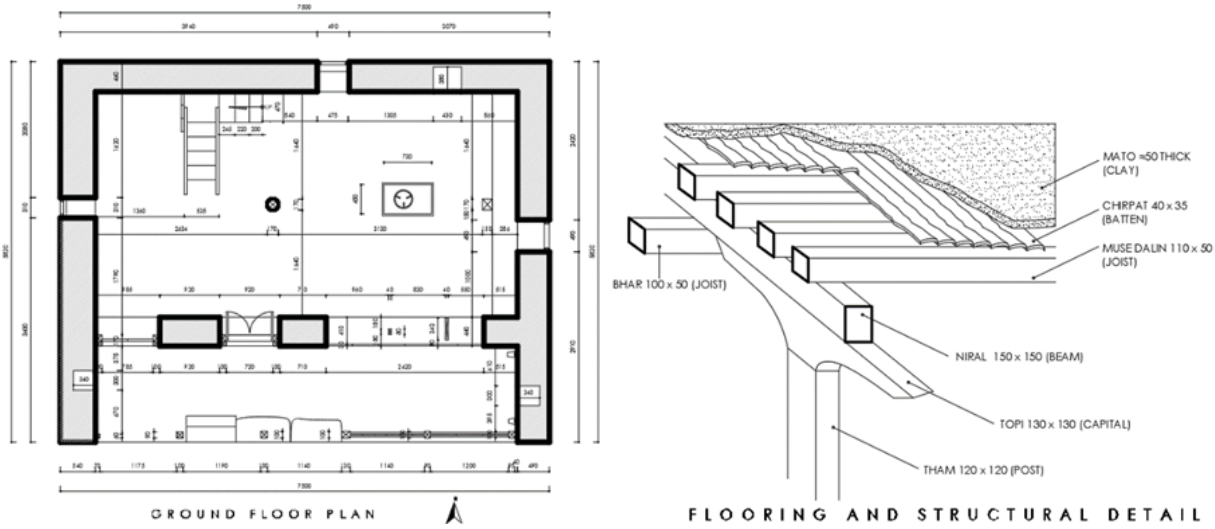

Figure 14: Plan and flooring detail in House code no. 80, Govinda Burathoki

4.2.2 Evolved forms with extended porches

The changes that occurred in the dwelling form in Gurja can be separated from the various house forms that now exist in the village (Fig. 11). Depending upon the construction material used, the dwellings are called as Chitre-ghar (bamboo-mat house), gare-ghar (stonewall house), dhunge-ghar (house of stone wall with slate roof) and tale-ghar (house with upper floor or attic).

5. Construction, building materials and structure

The gare ghar, dhunge-ghar and tale ghar in Gurjakhani village are built using traditional measurement units: hāt (45 cm), bitta (1/2 hat), and amal (angul: 2 cm). Larger houses typically have a frontage of 17–18 hāt and a depth of 12-13 hāt, while smaller houses measure 10–12 hāt in frontage with the same depth. These measures include wall thickness of the total depth, 3.5 hāt is allocated for ota (pindhi: veranda). Floor heights range from 4 to 5 hāt, with foundations (jung) measuring 1 to 2 hāt.

The dwellings are constructed using timber, stone, and mud. The stone masonry consists of minimally dressed boulders, with course levels varying according to boulder size. Wall thickness is typically one hāt (45 cm) on both the ground and upper floors. In some structures, walls are either stepped or gradually tapered from inner side. Mud mortar, locally known as kaana maato, is used for bonding. The walls are tied to the balesi dhuri (eave beam) using traditional timber joints: tokal (for the eave beam) and pakhura or saila (long wooden wedges). The ground floor, primarily used for living, has limited openings, while the upper floor—used for storing grain, household items, and utensils—features more openings for ventilation and access. The structural system is composite, with a timber frame supporting the floors. A minimal number of central timber posts are used, while beams are embedded into the masonry walls to tie the timber frame to the stone structure. Most wooden components are rectangular timbers, except the Mul Khamba (main post) on the upper floor. The front veranda, known as ota, features square posts. Closely spaced joists (dalin) are installed to support the heavy load from the floor above (Fig. 13).

Top Bahadur Chhantyal, an 80-year-old carpenter from Gurjakhani village, identifies various timbers used for structural members—such as ghasamor, thingre-salla, and bhung-salla—mainly for posts and beams. These are sourced from khola-kharka (south of the village across Gurja River) and paataal-kharka (west of the village). Another timber type, patkaa kaath, is specifically used for posts in dhanshar, a space designated for storing firewood and other materials.

The ground floor is finished with compacted earth, while the upper floor is constructed in layers, beginning with a chirpat (batten) base over which is laid 1 bitta (22 cm) thick clay layer, which according to the Carpenter makes the house more stable (Fig. 14). The surface is finished with a special mud mixture known as rana maato. Regular re-coating, traditionally carried out by women, is required to maintain the floor surface.

Dwellings in Gurjakhani primarily feature two roof types: dui pakhe (open gable) and putali paakha chhanu (gable end skirt roof). The roof pitch varies, between 21 degree to 24 degree. Roof construction follows two methods—one is stone slates laid on a mud layer over chirpat (battens), and another directly laid over battens without mud base.

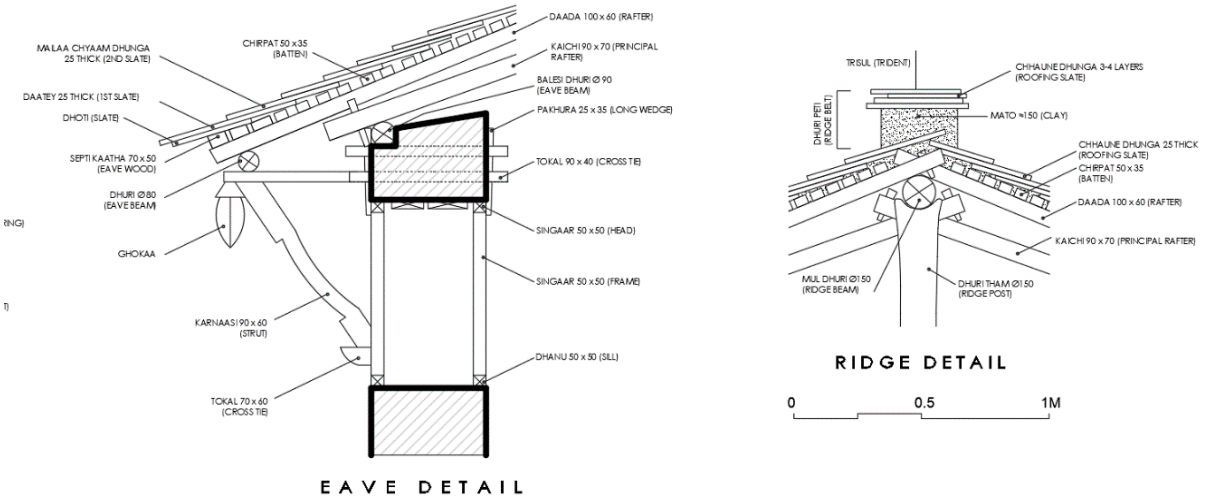

Figure 15: Eave and ridge detail

The roof is constructed in a specific sequence: chirpats are laid over the dada (rafters), followed by a 2 amal (4 cm) thick mud layer, and finally covered with chhai dhunga (roofing slates) of varying sizes and thickness ranging from 2 cm (at eave side) to 1.5 cm (ridge side). At the eaves, dhoti dhunga is placed first, followed by daante dhunga, and then topped with maaila chham dhunga, which acts as a waterproof layer suitable for the region's precipitation levels (Fig. 15).

The roof ridge is sealed with a 1 bitta (22 cm) thick mud layer, over which 3 to 4 layers of chhapani dhunga are laid to ensure protection during the rainy season (Fig. 15).

6. Conclusion

This research is carried out to find out the characteristic of Chhantyal settlement pattern at Gurja Khani in which it described harmony in socio –cultural aspect, geographical and environmental aspect. The dwellings at Gurja village are categorized on type basic which represented the community, locality and modification in buildings form in characteristic. The study also describes the construction technology and techniques of the traditional house constructed of stone, mud and timber elements that have changed according to time period. Inhabitants of the Gurja Khani are aware of conserving the village with traditional vernacular style to define the authenticity in the village. In additional, this survey has brought considerable extent of terminologies used in the building construction and daily life which is the important finding of the research.

Acknowledgment

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