Research on Traditional Highland Settlements Based on Distribution Style Analysis

A Comparative Study of the Settlements Along Takahashi River and Hino River in Japan and the Jinsha River in Shangri-La Region of China

流通様式分析に基づいた伝統的高地集落の研究

日本高梁川・日野川と中国シャングリラ金沙江の周辺集落を比較対象として

February, 2024

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目次・Content

Declaration

- “Highland, highland, Upland,” in this text, refers to the same meaning. Footnote 1 declared the specific reasons.
- This article follows the APA citation format. Due to the large number of references in each chapter, for readability, numerical annotations have been added immediately following the citation of references. The references in the list have been sorted accordingly.
- This article’s Tibetan place names or languages follow the Wylie transliteration. For instance, “Gedan Songzanlin Temple” in chapter 3 is translated as “Ganden Sumtseling Monastery.
- The main content of chapter 4 has been published in JAABE, referred to “Yiling Hua & Norihito Nakatani (2023) Study the influences of ethnic Han and ethnic Bai on Jidi village’s modern Tibetan dwellings in Shangri-La, China, Journal of Asian Architecture and Building Engineering, 22:6, 3320-3337, DOI: 10.1080/13467581.2023.2205476” But a few minor changes have been made to the content in order to align it with the study’s topic.

Chapter 1. Introduction 序論

Chapter 1　序論・Introduction

1.1 Background and Research Aim

The high-altitude regions have become a focal point of multidisciplinary research in recent decades due to its unique biological and cultural diversity, drawing widespread discussions in anthropology, geography, geology, and ethnology. In geography, highland and lowland are defined based on elevation, with higher elevations considered highlands and lower elevations as lowlands. In agriculture, the agricultural limit is a marker to distinguish between highland and lowland areas. From an ethnological perspective, highland and lowland cultures are differentiated by the diverse mountain ethnic cultures. Various unique characteristics of Highland World make it difficult to define from a single perspective, resulting in a lack of a clearly defined boundary between different categories of Highland World-related terms, as shown in Table 1-1.

Table 1- 1. Definitions of Highland World-related terms

Definitions	Highland	Upland	Alpine	Plateau
定義	高地	高地	高山性の	高原
Meaning & Description	A mountain region higher than surrounding lands, which is typically marked by higher elevations reaching or exceeding 600 meters above sea level.	A hilly region that is higher in elevation than surrounding lowlands, but not as mountainous as highlands. The elevation arranges from around 300m to 600m.	Refer to any mountainous terrains or environment characterized by high elevations.	A geographical conception. High plain. A large region of high elevated and fairly flat land.
Examples of Place Name contains those words.	Ethiopian Highlands (Africa), 4550m. Cameron Highlands (Malaysia), 1448m. Scottish Highlands (United Kingdom), 1345m.	Southern Uplands (United Kingdom), 430m.	Alps, with an average elevation around 4809m.	Tibetan Plateau, 5000m.Antarctica Plateau (Africa), 3000m. Mexican Plateau, 1825m.
Supplement Instruction	“highland” and “upland” are changeable sometimes.		--	--

In addition, different countries define highlands differently based on their unique geological features and landscapes. For example, an average elevation of 1,345 meters can be considered highlands in the European continent, but areas with an elevation of 700 meters are also part of the highland range in Myanmar Highland. It can be confirmed that high-altitude regions are a complex and inclusive concept, and there is currently no singular academic definition. Therefore, to conduct research on highland settlements, it is essential to first clarify the extent of previous research conducted by the academic community on the highlands.

Academic research regarding highlands initially focused on uncovering the “appearance” of

the highland world, including the exploration of rare biological species, the study of distinct geographical conditions, and the comparison of human adaptations, etc. Particularly, since the 19th century, high-altitude regions have been the focal point of biological research and spurred scholarly debates on the elevation boundaries that characterize the highlands. Through the biological adaptation of human night vision, McFarland identified 1500 meters as a distinction between high and low land in the 1960s (McFarland, 1969)[1)]. Pawson, a geographical research member of the International Biological Program (IBP), proposed that an elevation of 2,500 meters could potentially serve as a broad demarcation between highland and lowland regions. Pawson's classification takes into account the human body's adaptability to environmental conditions, including physical fitness, activity patterns, and thermal tolerance (Pawson, 1978)[2)]. The Andes in South America, northern Ethiopia, and the Tibetan Plateau were included within Pawson's delineations (as shown on the map below).

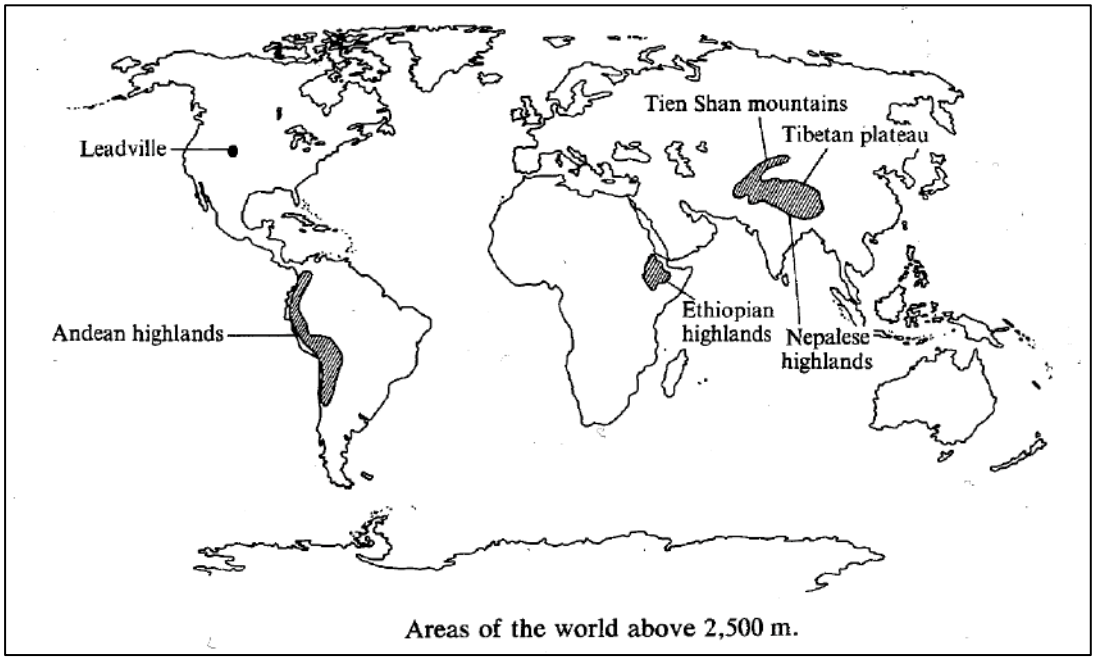


Figure 1- 1. The three Highlands defined by Pawson[1]

In 2019, Norio Yamamoto, a Japanese ethnologist and cultural anthropologist, critically expanded Pawson's established three highland regions by introducing Mexico's Mesoamerican Highlands as an additional highland region, as depicted in the map below (Yamamoto, 2019)[3)]. According to Yamamoto's highland theory, if the Ethiopian highlands—where human settlements are primarily found at an elevation of 2,300 meters—are to be included in the highland world, Mexico's highlands should also be included, given that they have a sizable population and a similar elevation. The four highland regions proposed by Yamamoto are situated within tropical or subtropical climate zones and home to substantial populations that has a long history of human habitation. (Figure 1-2)

[1] Cited from "Pawson, I. G. (1978). The high-altitude areas of the world and their cultures. The biology of high-altitude peoples, 17-45." p. 19.

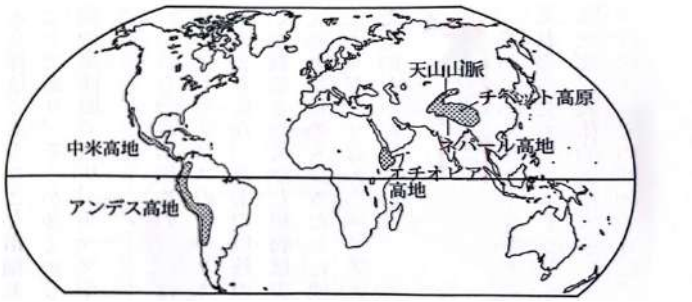


Figure 1- 2. The four Highlands revised by Yamamoto[2]

In conclusion, the classification of highland regions based on altitude has been the subject of extensive research throughout history. However, it is important to note that there is no universally agreed-upon standard or uniform criteria for such classification. Different academics have their own classification criteria, which are primarily based on distinct subject areas and research topics.

Elevation (or altitude), as a measurement unit for distinguishing highland and lowland worlds, seems to be the most appropriate and singular answer for differentiation. However, the study of highland settlements extends beyond geographical boundaries or layers; it is intricately tied to the human inhabitants residing within those areas and their ways of life and communication systems. During the three years of site investigation in Japan, it was observed that applying elevation to the study of settlements, particularly in exploring their livelihood patterns, significantly complicates the precise definition of what constitutes high or low settlements. For instance, considering the composition and operational patterns of settlements, there are sizable settlements comparable to Lhasa[3] in the high-altitude world above 4,200 meters along the Himalayan Mountains. These locations, characterized by flat topography, well-developed transportation, and a large population, experience a standard of living comparable to that of developed lowland cities such as Shanghai. Conversely, several settlements are hidden amidst the sprawling mountain ranges in the low-altitude world of the Japanese archipelago below 500 meters. Since ancient times, these villages have maintained a survival system akin to a utopian-style nomadic hunting society (such as the Matagi[4]), rendering them elusive to the outside world and earning the designation of "hidden realms." Even though these settlements are only a few hundred meters above sea level, they are more similar to proper remote highland settlements that operate independently than the previously mentioned 3,600-meter real high-altitude settlements with a lowland operational pattern.

Merely considering elevation alone cannot fully explain the phenomena mentioned above. Consequently, it raises several practical questions:

- *What are the features of a traditional Highland settlement?*
- *What are the livelihoods of a traditional Highland settlement?*
- *What is the essence of a traditional Highland settlement?*

These are the issues that this study aims to explore. This research is based on a basic understanding that the nature of "high and low" is not an absolute concept but a relative one to

[2] Referred to Reference "Yamamoto,N. (2019). The world of the tropical highlands: toward the discovery of a "highland civilization". Nakanishiya Publishers." Citied from p.42.
[3] Lhasa, the capital city of Tibet, China. Lhasa, situated in the center of the Tibetan Plateau with an elevation of approximately 3,600 m, is surrounded by mountains that reach 5,500 m. The population of Lhasa is approximately 578,400 people, with a Gross Domestic Product (GDP) of 74.184 billion yuan. It is one of the most developed urban areas representing the economy of the Tibet Plateau.
[4] The term "Matagi (マタギ)" refers to traditional hunters in Japan, particularly in the Tohoku region. More details of Matagi research can be found in the academic reports of Millennium Village Seminar in Nakatani Nohirito Lab.

conduct research. Relativity can be described as an intertwined association encompassing both contradictions and unity. For instance, the Himalayan region cannot be considered the world's highest staircase without lowlands, just as the notion of low-altitude worlds would be non-existent without high-altitude worlds.

Besides, there is a universally new question in current village studies. Over the past few decades of rapid global economic development, modernization and globalization have penetrated every corner of the modern society. Mountains no longer act as a physical barrier because of quick road building and improved communication networks. It is necessary to reconsider the theory by academics around 19th century that mountain barriers would render lowland civilization to influence high-altitude thought. Suppose this study can extract relevant arguments from analyzing the residential environment and architectural styles that best reflect changes within settlements. In that case, it may provide a new perspective on how modernization influences remote highland villages and how can the solution come. Therefore, this study focused on researching residential areas in highlands that are far removed from central areas. The peculiarity resides in understanding how and why remote highlands developed and survived from a comprehensive perspective.

1.2 Literature Review

The literature research in this study was divided into two sections. Firstly, it compiled outstanding studies on the high-altitude regions undertaken in numerous disciplines such as geography, humanities, and anthropology since the nineteenth century. It aimed to outline the evolution of existing research to identify its flaws and discover the inadequate part regarding to the rapid development of highland villages. Second, it examined comprehensive studies conducted in urban history and architectural history to discover a new methodology for researching highland villages.

1.2.1 Overview of Highland Research

1) Toni Hagen's Methodology for researching the Highland Region: the significance of arranging oral history [6]

Over the last several years, geographers have contributed substantially to the highland world's comprehensive geomorphological research. Among them, Toni Hagen's extensive research on Nepal's highlands in the nineteenth century brought the study of the high-altitude world to an academic climax. As the first foreign scholar granted permission to conduct geological surveys and mapping in Nepal, Toni Hagen entered Nepal during a blank period in the geological research of the Nepal's high-altitude world. Toni Hagen's contributions to the academic community were not limited to the cartographic mapping of the overall geographical profile of Nepal. More importantly, Toni Hagen academically showcased the mysterious high-altitude world of Nepal at the foot of the Himalayas during its closed-off phase through multidimensional record analysis, including the agricultural practices, transportation development history, and lifestyles of ethnic minorities within Nepal. His investigation into the lifestyle of the Sherpa ethnic group in eastern Nepal firstly documented the operational methods of the highland people's lives. The Sherpas, who resides at an altitude of approximately 3,800 meters above sea level, have no other daily necessities to maintain self-sufficiency except yak and dairy products. Because of the limitations of the natural environment, Sherpas sustain their livelihoods by trading with neighbors, such as Tibetans in the eastern Himalayas for rock salt and wool, and inhabitants of the lowland rice-growing regions of southern Nepal for rice, sugar, fuel, and oil lamps. As a result of Toni Hagen's research into the oral histories

of Sherpas, it was particularly discovered that Takari settlements formed because of trade points along the trade routes that led to Mustang. Toni Hagen clearly represented the communication mode between highland ethnic groups (Tibetans, Sherpas) and lowland groups surrounding the Himalayas by his on-site methodology. His approach has revealed the importance of arranging oral histories for understanding the livelihood of highland people, which is one of the research methodologies that will be employed for this study.

2) The Zomia Concept: an innovation approach differs from mainstream research[7]

Since the 1990s, academic research on the Asian Highlands has been divided according to national boundaries, such as Tibet (China), Nepal, India, Manymar, etc. The Dutch scholar Willem van Schendel stressed that such a research perspective neglects geographical units (he termed it "geographical ignorance"), and that this approach fails to fully comprehend the highland settlements concealed within the valleys around the border. In this context, Willem merged his field research in Southeast Asia with exploring border settlements across various countries. These settlements shared common traits, located amidst valleys and hard to access, which he named those villages Zomia by referencing the local language. "Zomia" is a term derived from Tibeto-Burman dialects spoken by mountainous residents in India, Bangladesh, and Myanmar border regions. "Zomia" combines "Zo," meaning "remote" in a relational sense, with "Mi," meaning people. Willem's departure from mainstream academic research methodology aroused considerable discussion among academics due to the new perspective far from tradition. James C. Scott, based on his recognition and criticism of the concept and scope of Zomia proposed by Willem, readjusted the scope from anthropological and political perspectives. It is necessary to explain Scott's theories about Zomia from his series of theoretical works that brought Zomia into a new wave of research.

3) James C. Scott's theories on the Highland World [8, 9, 10]

As a humanities anthropologist with a leaning towards political science, Scott's research perspective focuses more on individuals outside of political power. In the years 1978 to 1980, he conducted field research for two years in a small rice-growing village in Malaysia, observing how farmers engage in continuous struggles against those who seek to extract labor, food, taxes, and benefits from them in their daily lives and collective actions. Subsequently, Scott's research perspective shifted to the silent and nameless individuals within historical societies in Southeast Asia, such as the marginalized peasants and the mountain dwellers who often lack written records of their daily lives or even history. Scott's firsthand experiences residing within rural communities via homestays shaped him into a bottom-up researcher, enabling him to analyze the essence of states and political power through an anarchist lens. This perspective provides a novel approach to studying the mountain dwellers inhabiting highland regions. After the concept of Zomia emerged, Scott narrowed its scope from Willem's Afghanistan border to the northern mountains of India. Scott's theoretical framework on Zomia has several research highlights based on his understanding of small groups. Firstly, he proposed the concept that lowland civilizations before World War II were unable to cross the mountains to reach the highland world, suggesting that the mountainous regions are not only spaces of political resistance but also areas of cultural refusal. Furthermore, Scott argues for a symbiotic relationship between the Zomia and the lowlands, stating that a relatively complete history of the highlands cannot be written without ongoing dialogue with lowland centers. Likewise, a coherent history of the lowland centers cannot be written without considering the highlands. This perspective of symbiosis between highlands and lowlands becomes a key point that sets Scott's

research apart from other contemporary works. Thirdly, Scott's research on Zomia analyzes the operational wisdom of highland communities, highlighting their exchanges and interactions with the lowland in terms of material economy, cleverly utilizing the "inaccessible distance of highlands to the reach of lowland authorities" to explain that highland communities are not as crude, barbaric, or primitive as described by lowland authorities.

Although Scott clarified in the preface of his research that Zomia is not applicable to the modern era after World War II, it still generated considerable opposition. Despite the academic debate, Scott has provided academia with a broad-based research approach emphasizing the importance of integrating research objects into broader regional contexts. For instance, when studying the highland people of Zomia, researchers should not only investigate the mountains and the people themselves, but also need to consider how highlanders interact and relate to the lowlands. Scott's wide-area perspective offers a viewpoint to uncover this study's "high-low" interactive relationship.

4) Evidence of connections between Highlands and Lowlands around the world

In fact, the connections between highland and lowland regions, as mentioned in the research of Toni Hagen and Scott, has been extensively documented worldwide from ancient times to the present. This study takes the routes of material exchange in Southeast Asia, Japan, and Africa as explanations.

The Tea Horse Road[11] , a commerce road that spans across Southeast Asia. Since the West Han Dynasty (around 221 BC), the Tibetan people residing on the Tibet Plateau have faced challenges in cultivating vegetables due to the harsh ecological conditions. Their daily diet predominantly comprises high-calorie foods, resulting in a significant deficiency of ingredients that could provide essential vitamins and help balance their calorie intake. Tea, refreshing and capable of reducing greasiness while also supplying ample vitamins, became an important substance for the Tibetan people. Thus, a trade route involving the transportation of vitamins for the Tibetan people across the Asian highland world was established (as shown in Figure 1-3), known as the "Tea Horse Road." To meet the needs of high-altitude populations, a vertical logistics network spanning 500 meters to 5,000 meters above sea level developed over time. The Tea Horse Road lasted for several centuries until the gradual disappearance of caravan transportation with the establishment of modern transportation systems. During its heyday, the Tea Horse Road featured a complex network of routes. Taking the Yunnan-Tibet route as an example, the route originated from the tea-producing region of Pu'er in Yunnan (1,300m), and through the transport of horses, it transported tea leaves and tropical fruits from lowland areas to Lhasa (4,200m), and even crossed the Himalayas to reach Nepal and India, returning with valuable medicinal herbs (such as cordyceps and snow lotus, which are only abundant in high-altitude regions). Along the Tea Horse Road, resting stations for caravans served as small-scale trade exchange points and eventually developed into settlements or cities.

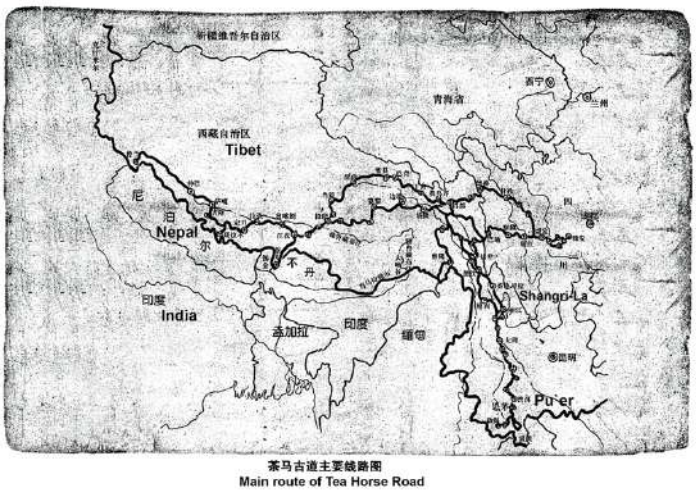


Figure 1- 3. The main route of the Ancient Tea Horse Road[5]

In a lowland world like Japan, salt trade routes have existed since ancient times. Although Japan does not have the concept of highland or lowland, there are well-documented historical records of trade in "salt" between mountain dwellers and coastal dwellers, known as "Shio No Michi"[12]. In Japan, salt production mainly relied on natural sources, and salt fields along the coast became the primary supply source for the entire country. Thus, a pattern of material exchange emerged between mountain dwellers and coastal inhabitants, where salt and marine products were transported from the coast to salt-deficient mountainous areas, and valuable timber or minerals from the mountains were transported back to the coast.

In the tropical highland world on African continent, models of material exchange between highlands and lowlands have been preserved since the last century. In Igeta Masayoshi's research, it is observed that the Aari ethnic group's settlements on the Ethiopian highlands exhibit a distinct pattern of material exchange[13]. The highland settlements, referred to as "Diji" in the Aari language, offer an abundance of bananas (Ensete ventricosum) and their roots while engaging in reciprocal trade with the lowland settlements known as "Daura," primarily centered around coffee. The mode of exchange varies based on the parties' specific requirements, encompassing both monetary transactions and barter involving material goods (As shown in the following figure).

M村の定期市における商品の取引形態と産地.

取引形態／産地	高地(ディジ) Highland (Digi)	低地(ダウラ) Lowland (Daura)	その他
物々交換 Barter	エンセーテの発酵でんぷん Ensete	コーヒーの葉 coffee leaves	なし
物々交換されるが，現金でも取引される Bartered also traded for cash	オオムギ，ケール*，ソラマメ，エンドウ，エンセーテの根茎部	モロコシ(穂)，トウガラシ，タロ，ヤム，バナナ，土器	木・竹製品
ほとんどの場合，現金で取引される Mostly traded in gold	テフ，タバコ，調理したエンセーテの発酵でんぷん	コーヒー(種子)，カルダモン，脱穀した穀類(シコクビエ，モロコシ，トウモロコシ)	地酒，塩，ンジェラ**，衣類，雑貨

* 非結球型のキャベツとその近縁種(*Brassica oleracea, B. carinata*)を含む.
** エチオピア原産のイネ科穀類テフを粉にして，水に溶き発酵させたものを円盤状にうすく焼いたもの．エチオピア高地の代表的主食素材.

Figure 1- 4. The exchange mode between Digi (highland) and Daura (Lowland) in Ethiopian highland[6]

[5] Referred to "Li X. (2012). The ancient tea-horse route: A study of ethnic corridors in the Hengduan Mountains, Himalayan cultural belt.," citied from p. 56.
[6] Referred to "Umesao, & Yamamoto, N. (2004). The world of the mountains: nature, culture, and lifestyle. Iwanami Shoten.," citied from p. 201.

While the content exchanged along the three routes mentioned above differs, the pattern of material exchange in the highlands and lowlands is the same. Essentially, the method of communication between highlands and lowlands is similar to Karatani's model of commodity exchange between nomads and settled agricultural communities (Figure 1-5)[14]. Settled or nomad, highland or lowland, these seemingly opposing communities have a very close communication relationship, and even their survival systems are impossible without the other. Due to the accelerated development of modern transportation and communication technologies, this once-obvious form of communication has been concealed. To truly understand highland settlements, examining their interaction with lowland settlements is necessary from a broader perspective.

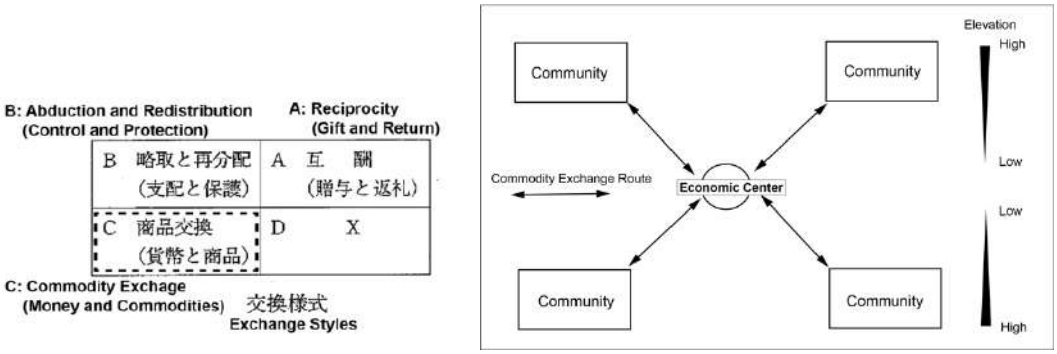


Figure 1- 5. The basic exchanges styles of communities [7]

1.2.2 Exploring Highland Research Method in the Study of Architectural and Urban History

A variety of research insights for this research can be gained from Territory's broad-area methodology. Architectural history and urban history scholars have not conducted direct theoretical research on highland settlements. Recently, however, some scholars in Europe and Japan have begun establishing a research framework referred to as "Territory"[8]. They define certain territories and research the relationships between villages, urban clusters, and their architectural or urban histories within those territories. Although the territorial research framework does not investigate the altitude differences between different villages, concentrating on settlement clusters within a specific territory shows that the different altitudes of the various settlements will create relative highland and lowland settlements within the territory. Therefore, this broad research approach provides valuable insights into studying lowland and highland settlements and their interrelationships. Some scholars' relevant theories are cited and discussed as a basis for this study.

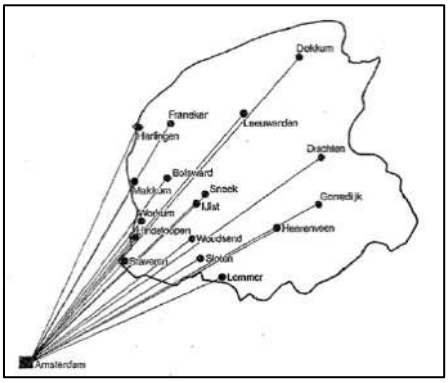
1) The inspiration from Ito Takeshi's Territory Theory of Urban Agglomerations

1 ,16

Ito Takeshi applied Territory theory to research eleven cities in the Friesland region of the Netherlands. Ito's Territory theory can be understood as having two dimensions: the first is a broad geographical scope, and the second is the broader time horizon, which incorporates the entire history of a city or region. In the time span, for example, it was through sorting out the history of changes in terrain and transportation that researchers discovered Dokkumer, the current agricultural center

[7] Referred to "Karatani, K. (2014). Yudoron: Kunio Yanagida and the mountain people. Bungeishunjū.," cited from p.196. Right side was drawn by the author.
[8] Territory, or Territorio, テリトーリオ/地域/領域.

of Friesland region, historically served the entire region as a port city. In geographical scope, material circulation routes were viewed as significant bridges connecting each city. City relation map of the 11 areas was derived from Ito's analysis of routes between cities, as shown in Figure 1-6 & 1-7.



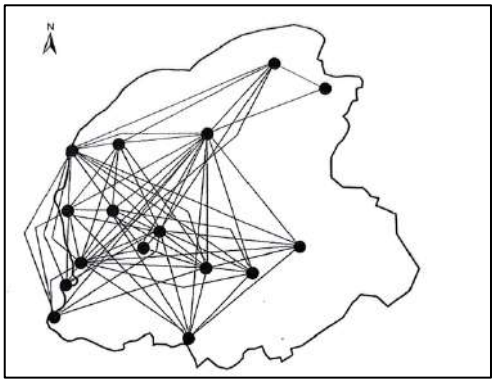


Figure 1- 6. The material circulation routes between Amsterdam and Friesland[9]

Figure 1- 7. The transportation network between 11 cities in Friesland region[10]

2) The inspiration from Jinnai Hidenobu's Territory Theory of Valley Rural Areas [16]

Jinnai Hidenobu researched Territory theory within five communities in the Orica Valley, a rural and agricultural zone in Italy. As with Ito Takeshi's Territory theory, Jinnai's Territory theory can be understood as geographical scopes and periods. In the geographical scope, Jinnai focused on the relationship between the natural conditions of the land and the operation ways of local inhabitants, including agricultural, animal husbandry, forestry landscapes and the transportation networks. In the time frame concept, they analyzed a settlement's history by reading old maps, aerial photographs, etc.

Similarly, Ito and Jinai analyzed the settlement structure and architectural styles, interpreted the street space, and derived regional relationships from a border perspective. Even Jinnai noted that the research has broken through from centralized metropolitan research to decentralized local research. However, both research objects primarily focus on the central places of economy, culture, and landscape. Furthermore, both examined the impact of remote settlements on communities located in central locations, the explaining diagram as Figure 1-8[11]. If the area covering highland and lowland settlements is taken as Territory, highland settlements are often far from the center region. Therefore, the above two scholars' viewpoints are all based on the lowland perspective to study the possible influence of the highland. However, the study will take an opposite perspective, focusing on remote villages far from the city center as the primary research subjects, as shown in Figure 1-9[12]. The interaction with lowland settlements across the entire territory will be examined according to the research perspective.

[9] Cited from Reference "Ito, T. (2012). Proceedings of International Symposium: Space, Culture and Regeneration of Cities in History, From the Viewpoint of International Comparison of Territory and Infrastructure. Tokyo University.". p. 219.
[10] Cited from the same source as above, p. 220.
[11] Figure 1-8 was drawn by the author.
[12] Figure 1-9 was drawn by the author.

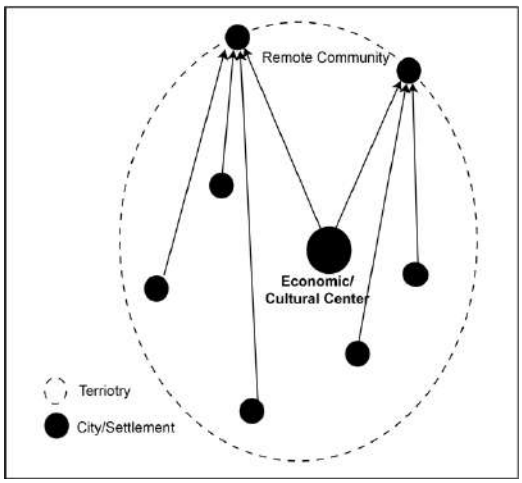


Figure 1- 9. The Territory Methodology diagram of Ito and Jinnai's research

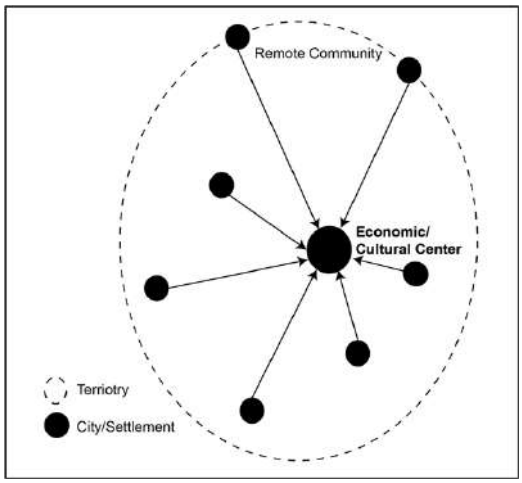


Figure 1- 8. Research perspective diagram of this study

1.2.3 Positioning of the Study based on Previous Research

This study seeks to analyze the characteristics of traditional highland settlements in Japan and China through a comparative examination of specific cases. Additionally, it aims to clarify the conventional ambiguous understanding of "highland" and directs its focus toward the "distribution patterns between highland settlements and lowlands." The thesis further strives to investigate the features and essence of highland settlements meticulously. Based on those as mentioned above cited previous research, the position of this study can be summarized as follows:

Firstly, current highland research ignoring the connection between highland and lowland. Most studies focus solely on highland settlements, neglecting the relationship between upland and lowland settlements. However, according to the analysis of actual cases, a close material exchange link between highlands and lowlands has existed since ancient times, which has been disregarded in previous studies. This study aims to bridge the gap in highland research and shed light on this neglected area.

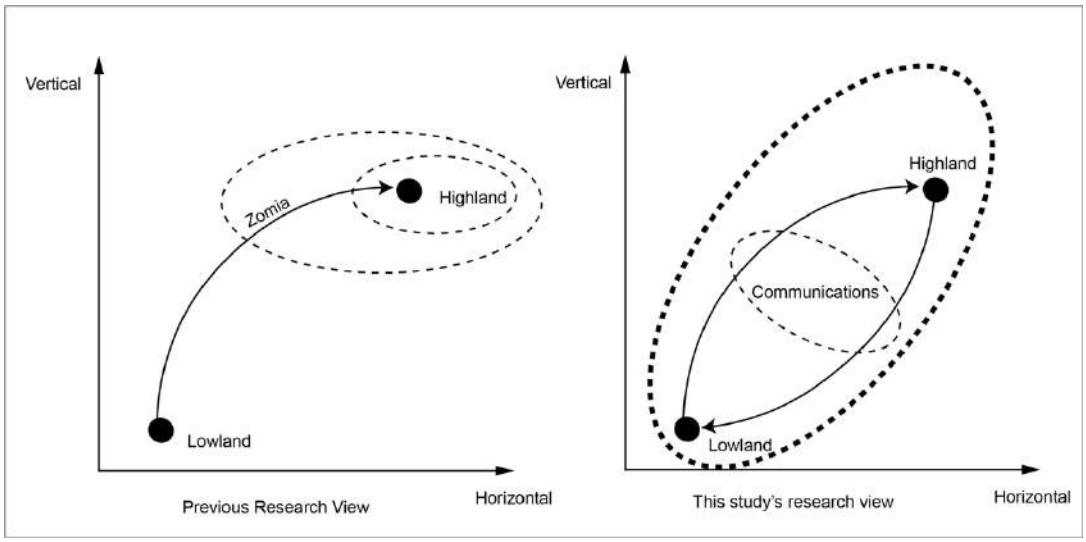


Figure 1- 10. The research view of this study [13]

[13] Figure 1-10 was drawn by the author.

Secondly, a border research perspective can be feasible in highland settlement studies. With the successful application of Territory theory to analyze the relationship between settlements and cities, we can extend the scope of research to include the lowlands in studying the highlands. As described above, this study will conduct research on highland settlements far from central areas with a broad scope that encompasses both lowlands and highlands.

From these two perspectives, this study will analyze highland settlements by examining their internal dynamics and the interdependence between highlands and lowlands while attempting to extract operational patterns and definitions of them.

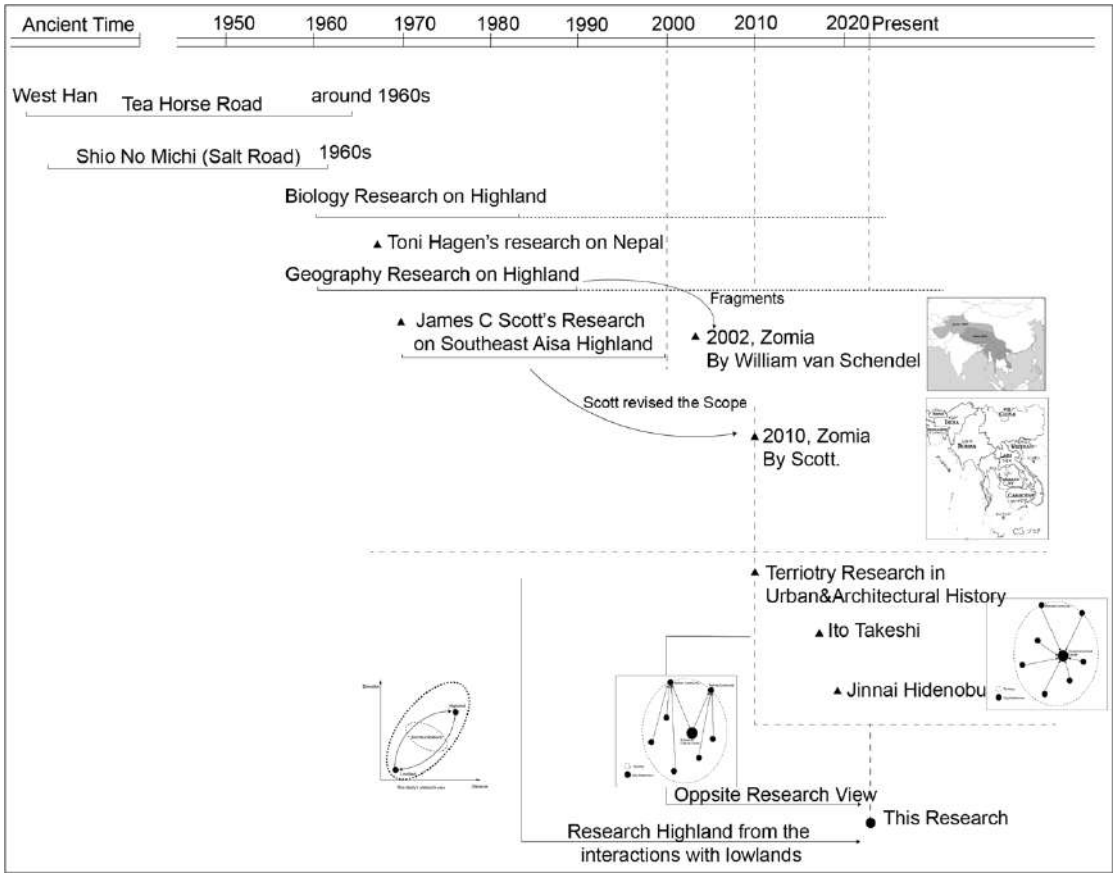


Figure 1- 11. Chronology of previous studies and the position of this study[14]

1.3 Research Methods

Depending on the research background analyzed above, this study will first attempt to establish the following hypothesis:

Highland settlements encompass more than altitude but also a unique operational living system. In response to survival requirements, highland residents engage in "restricted" material exchanges with lowland residents. The term "restricted" in this context refers to a limited range of movement by highlanders, implying that they engage in deliberate and intelligent material exchanges with

[14] Figure 1-11 was designed and drawn by the author. Zomia's pictures were cited from "van Schendel, W. (2002). Geographies of Knowing, Geographies of Ignorance: Jumping Scale in Southeast Asia. Environment and Planning D: Society and Space, 20(6), 647–668. p.653." and "Scott, J. C. (2010). The art of not being governed: An anarchist history of upland Southeast Asia. Nus Press. p.17."

lowlands. When highlanders acquire the necessary items for survival, they conclude the trade and return to the highlands to maintain their way of life. Over the centuries, this mode has remained unchanged. However, the development of modern society and convenient transportation systems have penetrated deep into the highland hinterlands, making this initially subtle pattern of constrained exchange between highland and lowland settlements increasingly blurred. This research aims to explore the operational models of highland residents and investigate potential fixed patterns of villages, explicitly focusing on the research perspective regarding the relationship between highland settlements and lowlands.

1.3.1 Research View: Broad Scope from Lowlands to Highlands Based on River Systems

As pointed out by Smith in the book "Rivers of Power," rivers are one of the most crucial components of human existence, serving five functions in human life: 1) access, 2) natural capital, 3) territory, 4) a healthy lifestyle, and 5) a means of exerting power[18]. It is also important to note that rivers connect regions from high mountains to the sea, facilitating a better understanding of highlands and lowlands. Moreover, rivers promise the precision required to conduct global comparative research. For example, when comparing the elevation differences of rivers in China and Japan, highland settlements in China's mountainous regions fall within a range similar to those in Japan (Figure 1-12) [19]. Therefore, the study thus adopts rivers as a perspective to broaden the understanding of highland settlements.

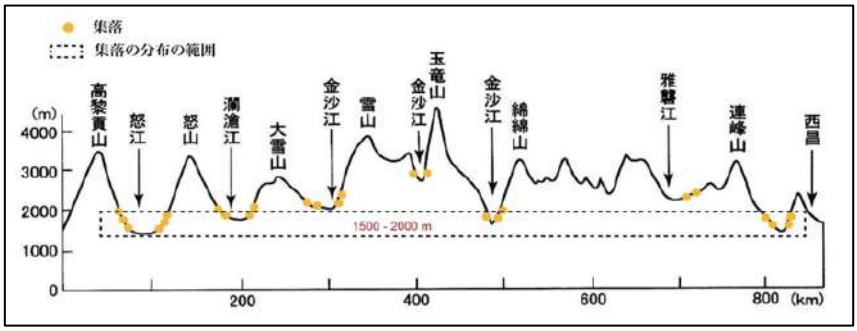


Figure 1- 12. The location of mountains, water systems and settlements in Hengduan Mountains, China[15]

1.3.2 Selection of Research Subjects Based on Literature Review

Content of preliminary literature research:

Population trends, topography/geology, climate, transportation history, disaster history, industry/occupation history, religious/cultural customs, and residential architecture.

Research subjects were selected based on the following two criteria:

- River systems that historically served as major transportation routes connecting lowlands to highlands.
- Regions where unique products were produced, particularly in the highlands, and further distributed to other areas.

Multiple river systems were chosen as candidates for investigation based on these criteria.

1.3.3 On-site Investigations and Subsequent Analysis

On-site investigations: Interviews, analysis of settlement structures, verification of current

[15] Figure 1-12 was re-edited by the author. The base figure was cited from Reference "Outline of the physical geography of China. (1982). China: The Commercial Press. p. 184."

lifestyles and occupations.

Analysis and considerations: Summarization based on the creation of elevation profiles and continuous regional characteristic maps using geological and topographical data obtained through on-site investigations.

1.4 The composition of this study

This research consists of six chapters in total.

Chapter 1 serves as an introduction, summarizing research conducted on traditional highland settlements across various disciplines globally since the 19th century. It analyzes the highland theory represented by Zomia and Toni Hagen's research on highland settlements in Nepal. Through a summary of different disciplinary research, this chapter discusses the current state of insufficient definition and pattern understanding of traditional highland settlements in academia. Based on this, Chapter 1 elucidates the research objective of this research to grasp the essence of traditional highland settlements through an absolute understanding of the high-low's relative. Moreover, this chapter outlines the research perspective to investigate traditional highland settlements within a specific watershed scope comprehensively. Previously successful research on settlement clusters in architecture, called Terriotri, informs this perspective.

In Chapter 2, the initial step involves summarizing the recent research on traditional highland settlements in Japan conducted by geographers and anthropologists since the previous century. The literature review consistently highlights the limitation of planar analysis methods in adequately illustrating the specific structures of Japan's traditional highland settlements. In response to this observation, Chapter 2 proposes a methodological framework leveraging architecture's distinctive capacity to portray settlement spaces by creating "riverside settlement cross-sectional diagrams." Subsequently, this methodology is implemented in examining 12 settlements in the Chugoku region of Japan.

Chapter 3 assesses the viability of generating cross-sectional diagrams for watershed settlements in high-altitude regions, as per the methodology introduced in Chapter 2. This segment examines China's geographical and human features and initially confines the research focus to the Shangri-La Mountain region. It subsequently reviews the existing research on highland settlements in the Shangri-La region, selects 12 settlements along the Jinsha River basin based on geographical and human attributes, and creates corresponding "watershed settlement cross-sectional diagrams."

Chapter 4 is an empirical study based on the discussions in the first two chapters, focusing on the "mutual exchange between highland settlements and lowland settlements." It specifically analyzes the changes in architectural styles of highland settlements' residences caused by the flow of building craftsman technology between highland and lowland settlements.

Chapter 5 provides a comparative analysis of chapters 2, 3, and 4. Through the comparative analysis of settlement sectional diagrams, distribution diagrams between highland and lowland settlements, and economic service radius maps, this study ultimately summarizes three significant characteristics of highland settlements: the external geographical features, livelihood, and essence of highland settlements. As a result of summarizing the research findings of each chapter, the study predicts the development patterns of future highland settlements. On the basis of this analysis, suggestions are made for the future development of highland settlements. In conclusion, this study offers valuable insight into the future of highland settlements and serves as a roadmap for future

planning.

Chapter 6 is a concise review and summary of the overall study.

The following figure illustrates the logical process:

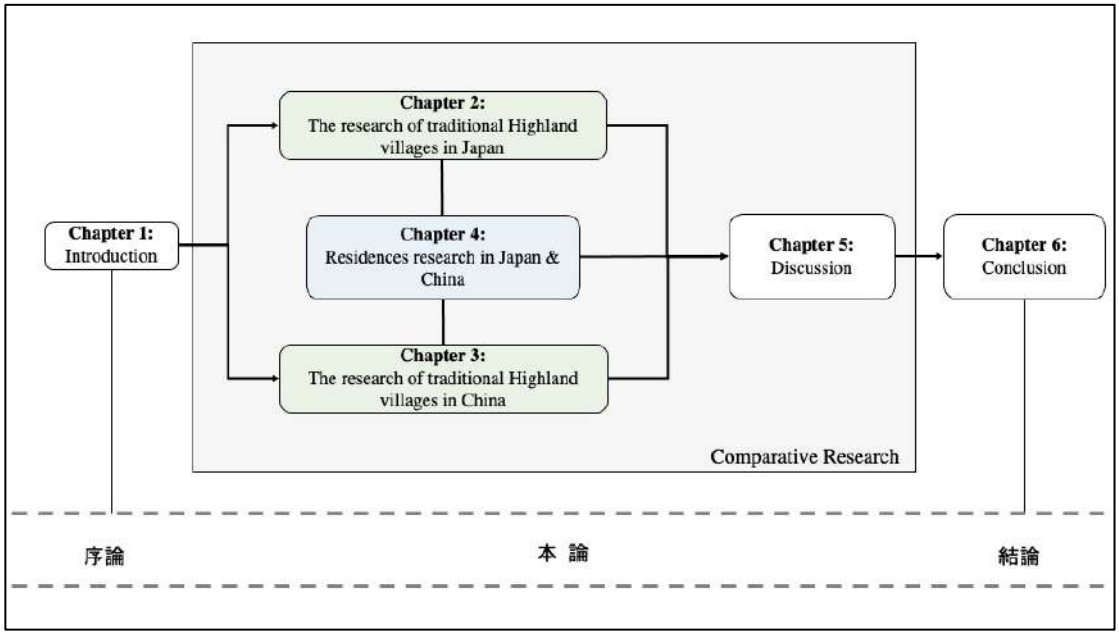


Figure 1- 13. The composition of this research[16]

[16] Figure 1-13 was drawn by the author.

1.5 References

1) McFarland, R, A. (1969). Review of experimental findings in sensory and mental functions. In Biomedicine of High Terrestrial Elevations, ed. A. H. Hegnauer, p. 250-65. Natick, Mass.: US Army Research Institute of Environmental Medicine.

2) Pawson, I. G. (1978). The high-altitude areas of the world and their cultures. The biology of high-altitude peoples, 17-45.

3) Yamamoto,N. (2019). The world of the tropical highlands: toward the discovery of a “highland civilization”. Nakanishiya Publishers.
(日)山本紀夫. (2021). 熱帯高地の世界 : 「高地文明」の発見に向けて. ナカニシヤ出版.

4) Yamamoto,N. (2021). Highland civilization: the discovery of “another four great civilizations”. Chuokoron Shinsha. (日)山本紀夫. (2021). 高地文明 : 「もう一つの四大文明」の発見. 中央公論新社.

5) Hagen, T., Wahlen, F. T., & Corti, W. R. (1961). Nepal: the kingdom in the Himalayas. Kümmerly & Frey.

6) Hagen, T., Corti, W. R., & Wahlen, F. T. (1971). Nepal.

7) van Schendel, W. (2002). Geographies of Knowing, Geographies of Ignorance: Jumping Scale in Southeast Asia. Environment and Planning D: Society and Space, 20(6), 647–668.

8) Scott, J. C. (1985). Weapons of the weak: Everyday forms of peasant resistance. yale university Press.

9) Scott, J. C. (1977). The moral economy of the peasant: Rebellion and subsistence in Southeast Asia (Vol. 315). Yale University Press.

10) Scott, J. C. (2010). The art of not being governed: An anarchist history of upland Southeast Asia. Nus Press.

11) Li X. (2012). The ancient tea-horse route: A study of ethnic corridors in the Hengduan Mountains, Himalayan cultural belt.
(中)李旭. (2012). 茶马古道: 横断山脉, 喜马拉雅文化带民族走廊研究.

12) Gihachi,T.O. (1978). Japan’s salt roads: a historical geographical study. Kokin Shoin.
(日) 富岡 儀八. (1978). 日本の塩道 : その歴史地理学的研究. 古今書院.

13) Umesao, & Yamamoto, N. (2004). (2004). The world of the mountains: nature, culture and lifestyle. Iwanami Shoten.
（日）梅棹, & 山本紀夫. (2004). 山の世界 : 自然・文化・暮らし. 岩波書店.

14) Karatani, K. (2014). Yudoron: Kunio Yanagida and the mountain people. Bungeishunju.
(日) 柄谷行人. (2014). 遊動論 : 柳田国男と山人. 文藝春秋.

15) Ito, T. (2020). Friesland: Architecture, City, and Territory in the Dutch Low Countries. Chuokoron Bijutsu Shuppan.
(日) 伊藤. (2020). フリースラント : オランダ低地地方の建築・都市・領域. 中央公論美術出版.

16) Ito, T. (2012). Proceedings of International Symposium: Space, Culture and Regeneration of Cities in History, From the Viewpoint of International Comparison of Territory and Infrastructure. Tokyo University.

17) Jinnai, H., Ueda, H. & Paolucci, M. D. (2022). Territorio in the Val d’Orcia, Tuscany: Reading urban and rural landscapes. Koshokorasusha.
(日) 陣内秀信,植田 & Paolucci, M. D. (2022). トスカーナ・オルチャ渓谷のテリトーリオ : 都市と田園の風景を読む. 古小烏舎.

18) Smith, L. C. (2020). Rivers of power: how a natural force raised kingdoms, destroyed civilizations, and shapes our world. Penguin UK.
19) Outline of the physical geography of China. (1982). China: The Commercial Press.
(中) 中国自然地理纲要. (1982). 中国: 商务印书馆.

Chapter 2. 本論・The research of traditional Highland villages in Japan

Chapter 2　本論・The research of traditional Highland villages in Japan

2.1 Literature Review: The research background of Highland villages in Japan

Geographically, Japan has no concept of highland settlements due to the limitation of the total altitude range that displayed a prevalence of low-lying areas characteristics. The villages of Japan are generally divided into three types: mountain villages, fishing villages, and rural villages. However, as an elongated archipelago, approximately 80% of Japan's land area consists of mountainous terrain. The remote isolation of mountain settlements imbues them with a captivating air of mystery akin to the enigmatic highlands. Therefore, these hidden mountain communities have a distinct highland lifestyle and culture seemingly untouched and inaccessible to the outside world. In order to obtain a better understanding of highland settlements in Japan, it is necessary to conduct an analysis based on the existing research status on mountain settlements. Anthropology and geography are two crucial disciplines in studying Japanese mountain villages, with scholars Yanagita Kunio and Miyamoto Tsuneichi representing key figures in this area of research.

2.1.1 Mountainous villages' research in Anthropology [1), 2), 3), 4)]

It was in 1909 that Yanagita Kunio, one of the scholars first to study mountainous folk customs in Japan, described in his book "*Nochi no Kari-kotoba no Ki* " the lives of mountain villagers in Shiiba village who relied on slash-and-burn agriculture and hunting. This marked the beginning of Yanagita Kunio's mountain people research. Subsequently, based on oral accounts from friends about mountain village legends such as Tengu and supernatural beings, he wrote the book "*Tōno Monogatari*," which allowed him to gradually establish his conceptualization of the world of mountain villages and their inhabitants. During his field research in Shiiba village, Yanagita Kunio observed profound differences between mountain communities and lowland communities in their attitudes toward land. Remarkably, he was intrigued by the mountain villagers' collective approach to land and their cooperative self-sustaining way of life, which he considered a reflection of utopia. He proposed that the mobile lifestyle of the mountain villagers contributed to this utopian phenomenon.

…彼等の土地に対する思想が、平地に於ける我々の思想と異なって居る…
…此山村には、富の均分というが如き社会主義の理想が実行せられたのであります『ユートピヤ』の実現で、一の奇蹟であります…[17]

As a result of his study of Sanda village in 1926, Yanagita Kunio analyzed the characteristics of mobile settlements and the fact that mountain dwellers do not require permanent family shelter as do lowland people. Kunio Yanagita focused primarily on methods of inheritance and documentation, emphasizing the difference between lowland and highland lifestyles. Specifically, his research highlighted the differences between mobile mountain communities and settled lowland communities. Later in 1964, the book "*Yama ni Ikiru Hitobito*" wrote by Tsuneichi Miyamoto described how mountain dwellers, driven by the need for salt and medical treatment, walked along mountain paths known only to them to interact with lowland communities. Miyamoto documented the unique cultural interactions between mountain people and lowland residents. In contrast to Yanagita Kunio's research, which focused on recording mountain people's distinctive lifestyles, Tsuneichi Miyamoto's study served as an empirical documentation of the connections between highland and lowland settlements. Their research all describes a mysterious environment in which

[17] Referred to "柄谷行人. (2014). 遊動論 柳田国男と山人. 文藝春秋.", cited from p.68.

mountain people live in isolation, as different from the lowlands.

2.1.2 Mountainous villages' research in Geography [5), 6), 7)]

Subsequently, geography emerged as the leading force conducting systematic research on Japanese mountain villages, with some scholars particularly emphasizing the vertical elevation differences in these regions. Keiji Tanaka proposed 1,300 meters as the defining line for Koukyo Shuraku [18] (highland settlements) in the Central Highland by analyzing the distribution characteristics of crops like apples, oranges, and vegetables at varying elevations [5)]. He asserted that Koukyo Shuraku had a unique isolation and distinct settlement landscapes due to agricultural limitations. Furthermore, Inoue Shuji researched the distribution of inhabited and uninhabited areas by investigating the nine mountain huts in highland settlements [6)]. The results revealed that the residential altitude limits varied across different mountain regions. For instance, areas above 700 meters remained uninhabited in the Nikko region, whereas in the Fuji region, uninhabited areas were found above 1,000 meters.

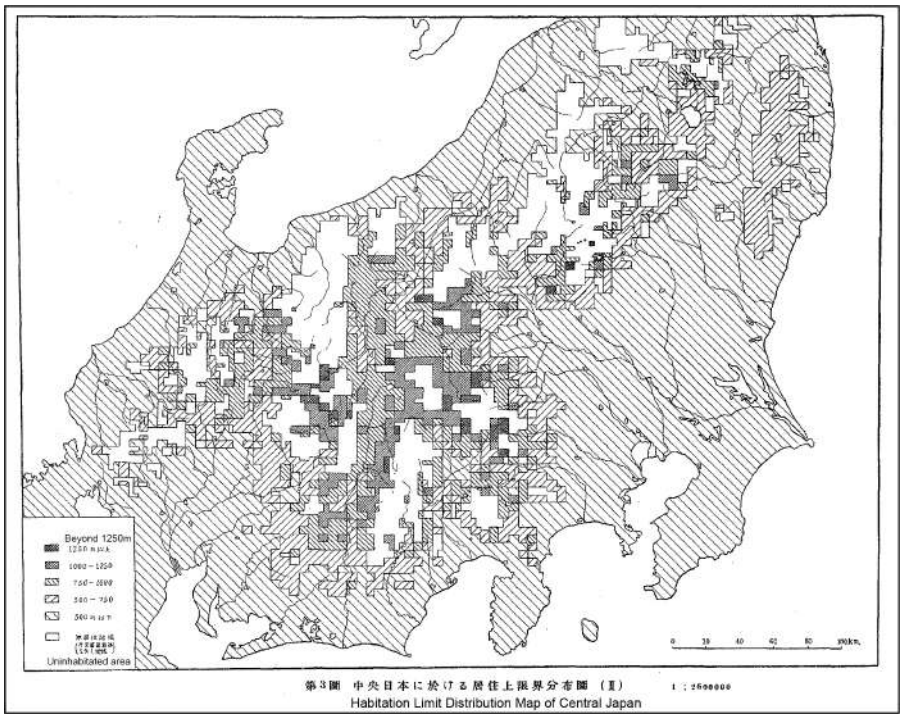


Figure 2- 1. The habitation limit distribution 2D map of the central Japan[19]

In 1975, Yamaguchi Gengorou analyzed mountain villages in Japan's central highland region, tentatively suggesting the categorization of settlements above 1000 meters as high-altitude settlements [7)]. Additionally, Yamaguchi classified these settlements into eight types based on their industrial forms, including forestry settlements, agricultural settlements, mining settlements, and more.

Geographers' study of highland settlements in Japan corresponds with the contents discussed in the first chapter, where defining highland settlements with a unified altitude unit proves unattainable. As Inoue also noted in his study, it is nearly impossible to establish a uniform standard

[18] 高距聚落, Koukyo Shuraku,

[19] Cited from Reference "井上修次. (1934). 本邦最高地域の居住状態と居住上限界の分布とについて (2) 高地居住調査 (第 1 報). 地理学評論, 10(9), 799-815.", pp 57.

altitude limit within a specific area, as different limits indeed vary from one region to another. Furthermore, the research conducted by the scholars above faces two issues: Firstly, the research area is primarily limited to the recognized high-altitude region of the Japanese central plateau, which may not be widely applicable. Secondly, the nature of geographical research often directs more attention to the location of settlements rather than their distinctive characteristics, leading to predominantly 2D planar representations of the results.

2.1.3 Mountainous villages' research in Architecture [8), 9), 10), 11)]

The study of mountainous villages in architectural history originated from surveying traditional folk house, with Jiro Konwa being a prominent researcher in this field[8)]. Subsequently, many architecture scholars, such as Eizo Inagaki, have researched mountain villages. Rather than emphasizing the location of villages, these researchers prioritize exploring the internal characteristics of settlements. Drawing on the historical understanding of Shirakawa Village's rugged agricultural land and constrained geographical conditions, Eizo Inagaki aimed to interpret how the social system in a closed mountain village influenced residents' living spaces[9), 10), 11)]. His focus was examining aspects containing the layout, spatial utilization, and construction systems of residential buildings to explore the impact of the long-standing extensive family system or original cooperative system within the mountain community. According to the research on the construction system of residential houses, the village system within the mountain village is rediscovered, in which families exchange labor equally. Inagaki revealed the collaborative process between Yui construction workers and Daiku (architecture workers) from traditional families in building residential houses. These unspoken but voluntarily observed mutual-aid working groups in mountain villages affect the architectural modules and scale of residential houses and significantly influence villagers' perceptions, extending beyond housing to encompass their way of life. Inagaki's research concretized otherwise invisible production systems through a detailed analysis of visible objects.

Recently, in the realm of architecture, the concept of "Territory" has been introduced to provide a comprehensive approach to studying clusters of settlements (Figure 2-2)[12)]. However, its application in Japan primarily focuses on the impact of lowland industries extending into highland areas, and there has been limited exploration of understanding highland settlements through the interconnectedness of highland and lowland regions.

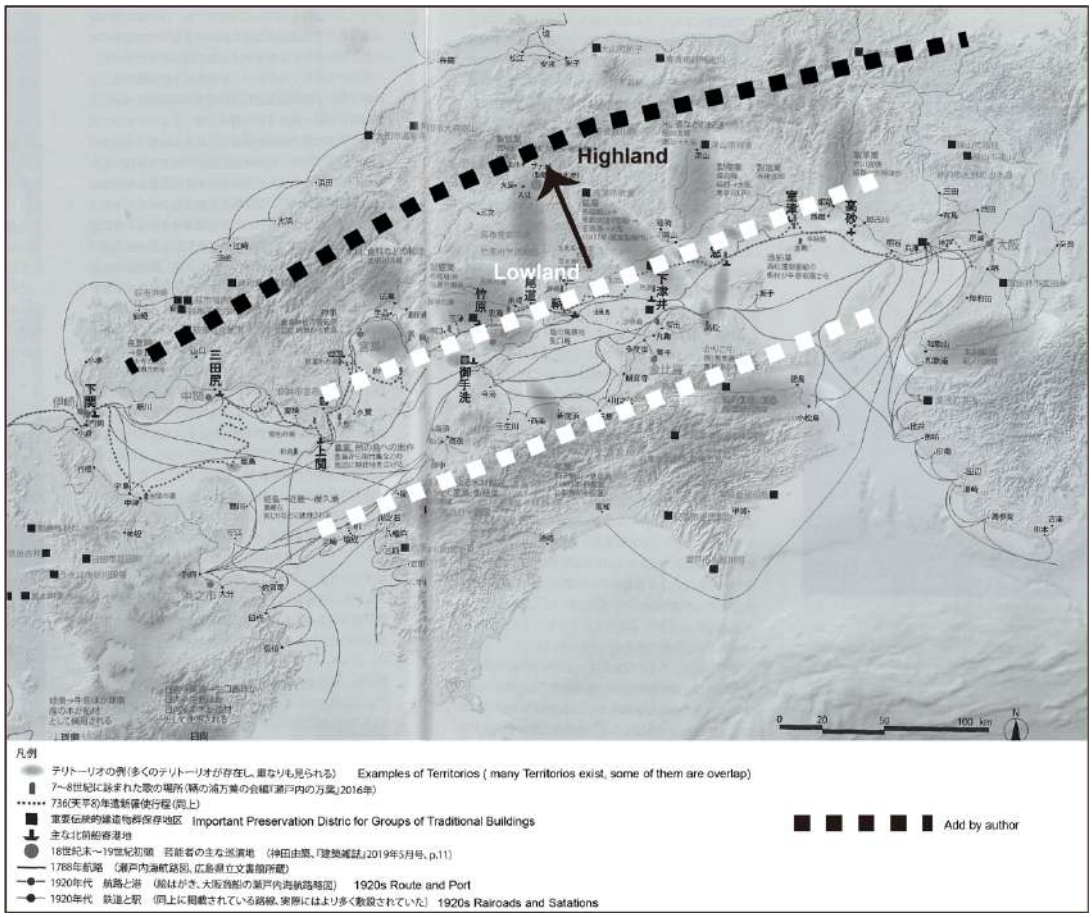


Figure 2- 2. Territory research in Japan [20]

Many research findings from various villages have been limited to two-dimensional perspectives for a long time. The 2D viewpoint, however, falls short of adequately capturing the nuances of interactions between different settlements. It is noteworthy that in recent years, there have been notable three-dimensional advancements in Japanese settlement study. These studies have effectively illuminated the complex interrelationships among settlements by integrating factors such as settlement structure, elevation, geology, architectural design, village arrangement, transportation, and more. An integrated approach has emerged in architectural history that integrates disciplines such as architecture, geography, and humanities. Specifically, Yuki Tono and Norihito Nakatani created three-dimensional sectional drawings of settlement clusters to depict the connections and dynamics among settlement clusters visually. Using three-dimensional research methods to illustrate flow relationships between settlements provides valuable references points for this study, which focuses on examining the relationships between highland and lowland settlements.

Overall, while there have been numerous individual studies on Japanese mountain villages, there is a notable absence of fresh research perspectives that specifically delve into the interactions between mountain villages and lowland areas to define the characteristics of Japanese traditional highland settlements. The fundamental reason behind the exchange and interaction between mountain and lowland settlements in Japan mirrors the global phenomenon of highland-lowland distributions arising from constraints on natural resources. As mentioned by Tsuneichi Miyamoto [3],

[20] The base map cited from Reference "樋渡彩.(2019). 近畿大学工学部建築学科都市歴史研究室報告書," p. 26.

mountain people require access to salt from the coastal lowlands. Similarly, the unique geographical environment of the highlands provides abundant scarce resources to the lowlands, such as minerals and forestry, which gave rise to various mobile social groups in Japan, such as woodworkers, ironworkers, and hunters. Moreover, the mode of transportation plays a significant role in the interaction between highland and lowland areas. In times when modern transportation was not widespread, communication between highland and lowland residents primarily relied on mountain ridges and riverbanks, which is accordance with the lifestyle in Himalaya regions. Horses and boats, accordingly, became essential means of transportation. Alternatively, Japan indeed features highland settlements, but they are encompassed within the broader category of mountainous settlements. Due to a lack of prolonged research into the movement from highland to lowland, Japan's concept of highland settlements has been largely disregarded. Therefore, adopting a perspective focused on the interaction between highland and lowland areas to deconstruct the research on Japanese highland settlements has become a new approach that can offer a fresh viewpoint to existing studies.

2.1.4 The Position of this study: Compilation of research on Japanese Highland settlements

Based on the literature review results previously mentioned, this study has compiled representative works in the fields of geography, anthropology, and architecture related to the study of highland settlements. Charts have been created to illustrate these findings. Additionally, this study has identified its position within the existing body of research by tracing the research context (Figure 2-3).

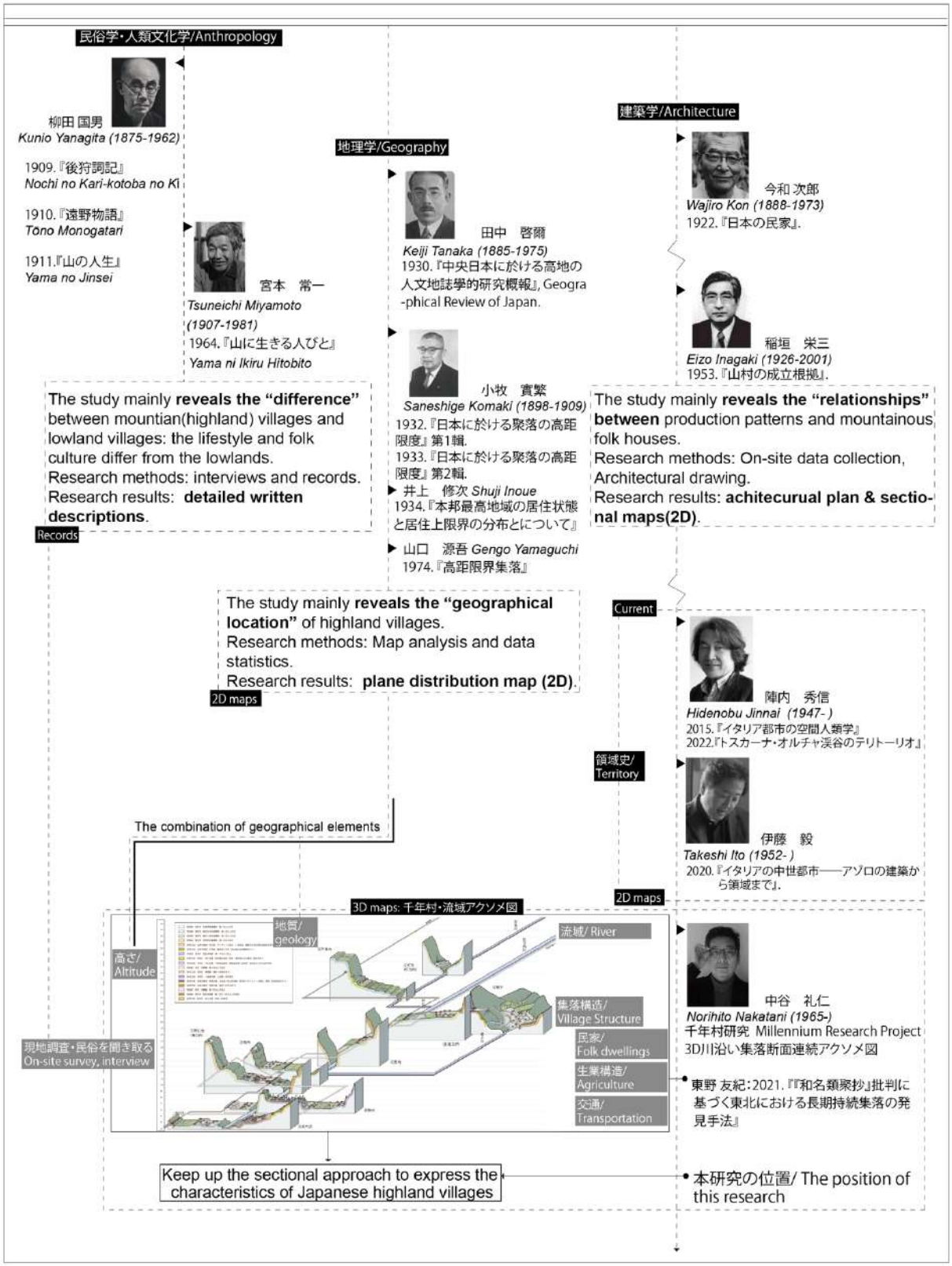


Figure 2- 3. A pre-review chronology of relevant highland settlement research in Japan[21]

[21] Figure 2-3 was designed & drawn by the author. All the photographs of the researchers are sourced from publicly available sources. The section map is cited from master thesis of Tono Yuki, Nakatani Norihito lab.

Before constructing the research framework specific to this study, it is essential to understand the historical movement patterns between highland and lowland settlements in Japan. The research of Tsuneichi Miyamoto indicates that highland settlements in the deep mountains of Japan were not simply engaged in direct exchanges of goods with lowland settlements. As a result of the distances and historically inconvenient transportation systems, a third category of auxiliary settlements, known as hubs, emerged to facilitate the movement between highland and lowland areas (as shown in Figure 2-4). Hubs serve as economic exchange points and labor gathering points between high and low areas, contributing to the flow of goods and services. The traditional Japanese settlements known as Shukuba are essential transportation hubs for exchanging labor, goods, and economy. Consequently, this study will follow the broad framework of "Highland Settlements-Hubs-Lowland Settlements." An in-depth investigation will be conducted to determine which geographical region of Japan will be the subject of the study.

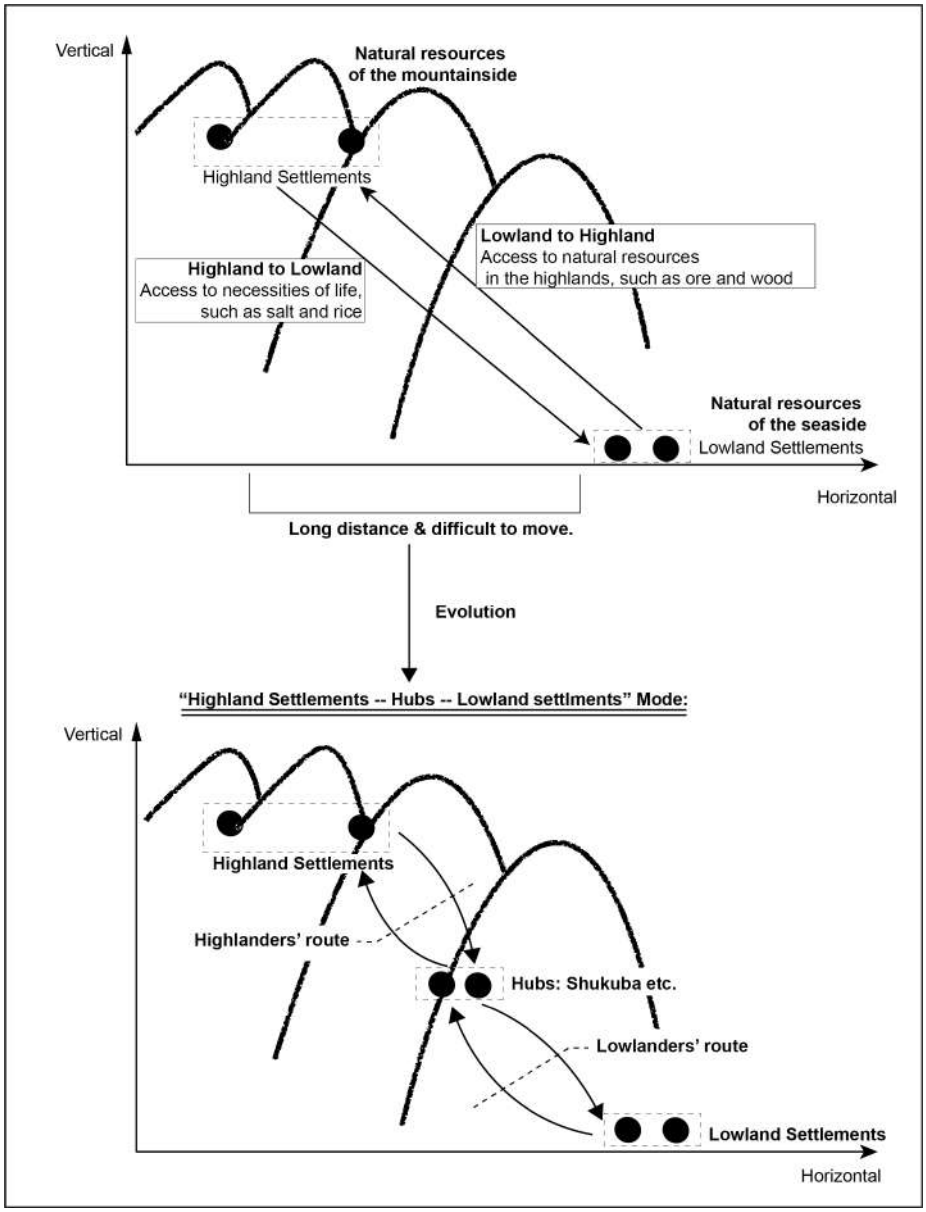


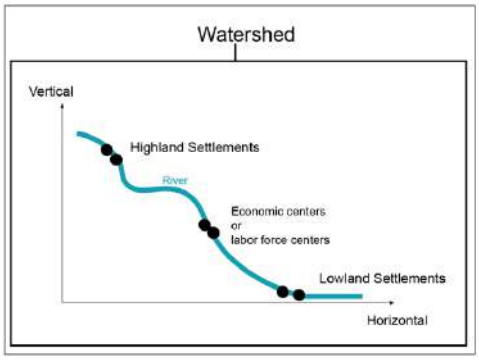
Figure 2- 4. Hypothetical models of distribution between Japanese Highland and Lowland settlements[22]

[22] Drawn by the author.

2.2 Research Objects in Japan

As the research framework for Japanese highland settlements in this study follows the "Highland-Hub-Lowland" model as mentioned above, the scope of the research area is automatically extended. In constructing this comprehensive framework, the following three perspectives have become crucial foundational pillars:

①. **The perspective of the watershed:**



Along rivers, settlements can be traced from coastal settlements at the river mouth to highlands where the river originates, with various forms of settlements occurring along the intermediate reaches. The watershed is a crucial foundation for the execution of this research.

Figure 2- 5. Diagram of watershed view

②. **The perspective of the Transverse:** Although the Japanese archipelago is narrow and long, from a geographical perspective, there is a central drainage dividing all of the main islands of Japan. This drainage system lies at a higher elevation and is part of the mountainous boundary ridge of Japan. Many of Japan's rivers originate from this line and flow towards the east and westward oceans. Rivers that cross this boundary or connect across it link different oceans, creating a logical basis for constructing the study framework that interconnects high and lowland villages.

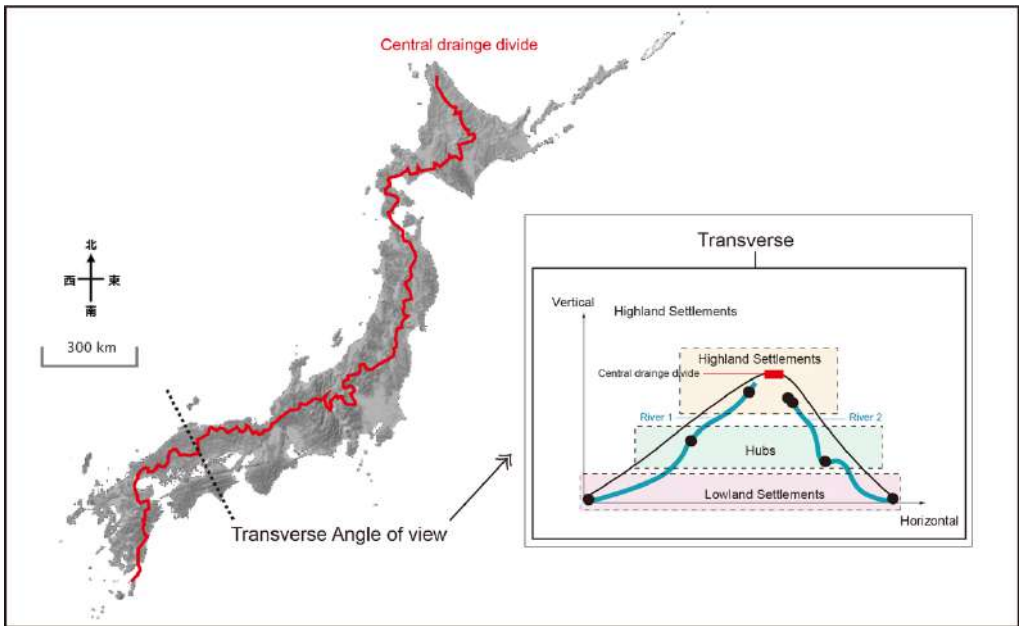


Figure 2- 6. The central geological line of Japan[23]

③. **The perspective of the industry**: The industries are crucial to the movement between highland and lowland areas. Therefore, the research on highland settlements that this study establishes

[23] Drawn by the author, the base map is from the Geospatial Information Authority of Japan.

needs to unfold in regions of Japan's history that possess unique industrial mountainous resources.

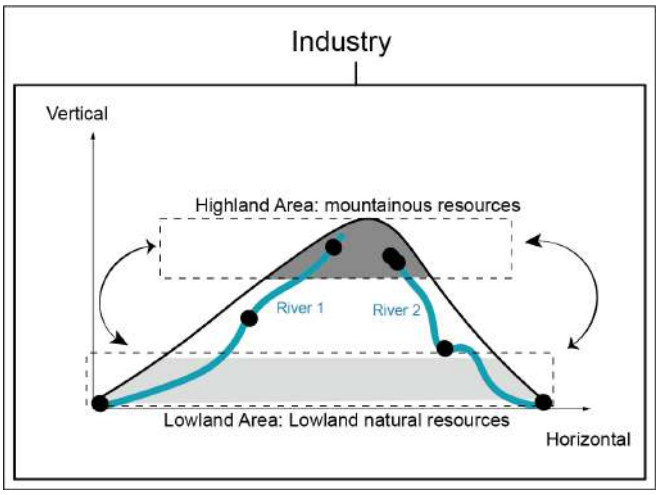


Figure 2- 7. Diagram of natural resources between Lowland and Highland area

Based on the three fundamental elements, this study ultimately narrowed down the research area to the Chugoku Mountains throughout Japan. The selection was primarily based on two factors: the historical special industry and the highly developed communication network between the mountain regions and the lowlands, which differs from other regions.

The Chugoku Mountain Regions harbor Japan's most unique and ancient mountain iron resources. Before the Industrial Revolution, a distinctive iron production technique known as the "Tatara system" thrived in the central mountains of the Chugoku region. This method encompassed mining, smelting, and iron forging. Tatara culture emerged as a defining aspect of the Chugoku Regions' industrial heritage intertwined with local settlements. Furthermore, villages along the Seto Inland Sea and the Sea of Japan consistently produced essential crops such as salt, rice, and fish, creating distribution networks within mountainous regions along the Salt Road. Historically, this region has been characterized by the movement of residents between the highlands and the lowlands. Its uniqueness is exemplified by what Tsuneichi Miyamoto describes in his folklore investigations: the most significant difference between Chugoku Mountainous Region and other parts of Japan lies in being Japan's most significant sand iron production area, resulting in a high degree of exchange of goods and people between mountain and plain dwellers since ancient times (Tsuneichi Miyamoto, 1976)[24].

To conduct research in the Chugoku Mountains of Japan, it is essential first to conduct an in-depth analysis of various factors such as the history, geography, and culture of the Chugoku Mountains. The characteristics have been summarized as follows.

2.2.1 Characteristic 1: Historical Highland resource - The ironmaking system in Chugoku regions[14), 15), 16), 17)]

The earliest use of iron tools in Japan can be traced back to the Yayoi period when iron products were imported from the Chinese mainland and the Korean Peninsula. Japan itself began producing iron items only after the Kofun period. Due to the presence of iron sand suitable for forging iron tools in deeply weathered granite, a unique ancient ironmaking method known as Tatara system

[24] Cited from "宮本常一. (1976). 中国山地民俗採訪録.『中国山地民俗採訪録』", p. 52. "中国山地には他地方と異なり、早くより交易交通ともに非常に発達していた… 砂鉄の産地として、山と海の人の来往は多かった…"

emerged in the later stages of the Kofun period in the granite-rich Chugoku system. During the Edo period's peak, iron products from Chugoku mountainous areas accounted for over 90% of Japan's national production, establishing the region as a prominent iron-producing area. What sets the Tatara ironmaking system apart is its reliance on iron sand as raw material and a significant amount of charcoal for smelting and refining. Among all of Japan, the Chugoku mountainous areas stand out as the most abundant source of granite. Simultaneously, the moist and rainy conditions of the Chugoku regions foster a wealth of forest resources, turning them into prime charcoal production regions. The distinctive natural setting, abundant in iron-rich sands and carbon, positions the Chugoku district as the foremost location for the evolution of the Japanese Tatara ironmaking process.

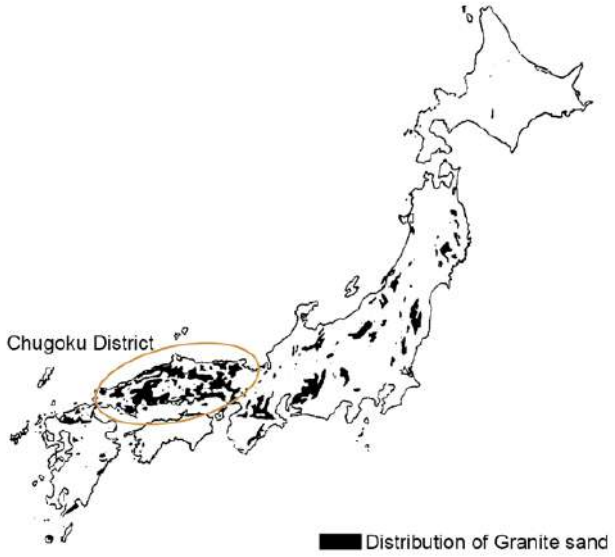


Figure 2- 8. The distribution of Granite sand in Japan[25]

The Tatara ironmaking process involves a complex chain of operations, including Kanna-nagashi, which separates iron sand from the mountain soil, and Tatara, which involves hammering and forging the iron sand. In simple terms, Tatara ironmaking involves manually extracting iron-rich sand from the mountainside, using controlled water flow down the slope to separate the sand iron, and then collecting the settled iron sand at the foot of the mountain. This collected sand is then moved to a smelting house for further refinement through firing. Numerous steps, ample space, and a significant workforce are required to complete this series of tasks. Tatara became a crucial pillar industry in the ridge areas of Chugoku regions, which led to substantial movement of human and natural resources. However, due to technological advancements, the Tatara ironmaking method eventually ceased during the latter part of the Meiji period, as it could not compete with the more convenient and cost-effective Western iron industry. The development of Tatara ironmaking can be broadly categorized into three stages: development, prosperity, and decline, as explained in the following figure (Figure 2-8[26]).

[25] Cited from is from the Geospatial Information Authority of Japan.
[26] In figure 2-8, the chronology is designed and drawn by the author. The industry map is from Reference "角田徳幸.(2019). たたら製鉄の歴史. 吉川弘文館.".

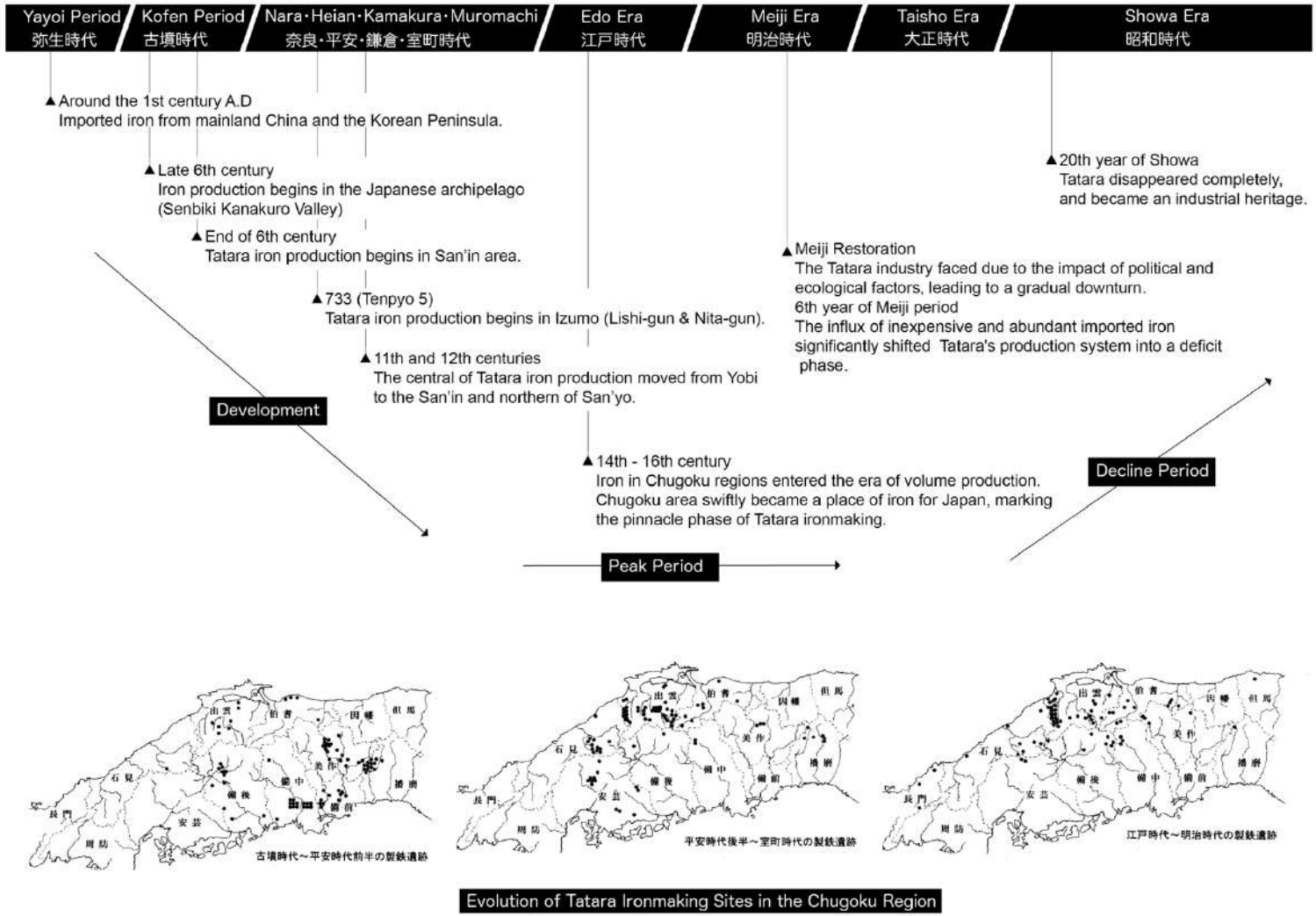


Figure 2- 9. Evolution of Tatara Ironmaking System in Chugoku Regions

The primary characteristic of Tatara ironmaking lies in its direct transformation of natural resources into iron products through human hands. In particular, Kana-nagashi, the artificial mountain excavation, has directly impacted the change of the entire landscape. The "Kanna-nagashi" method cleverly adopts the terrain's elevation difference. It transports the soil manually excavated using tools from the mountainside to the foothills through constructed waterways along the mountains. During this transportation process, by setting up various settling ponds, the iron sand is separated from the sediment with the assistance of natural gravity.

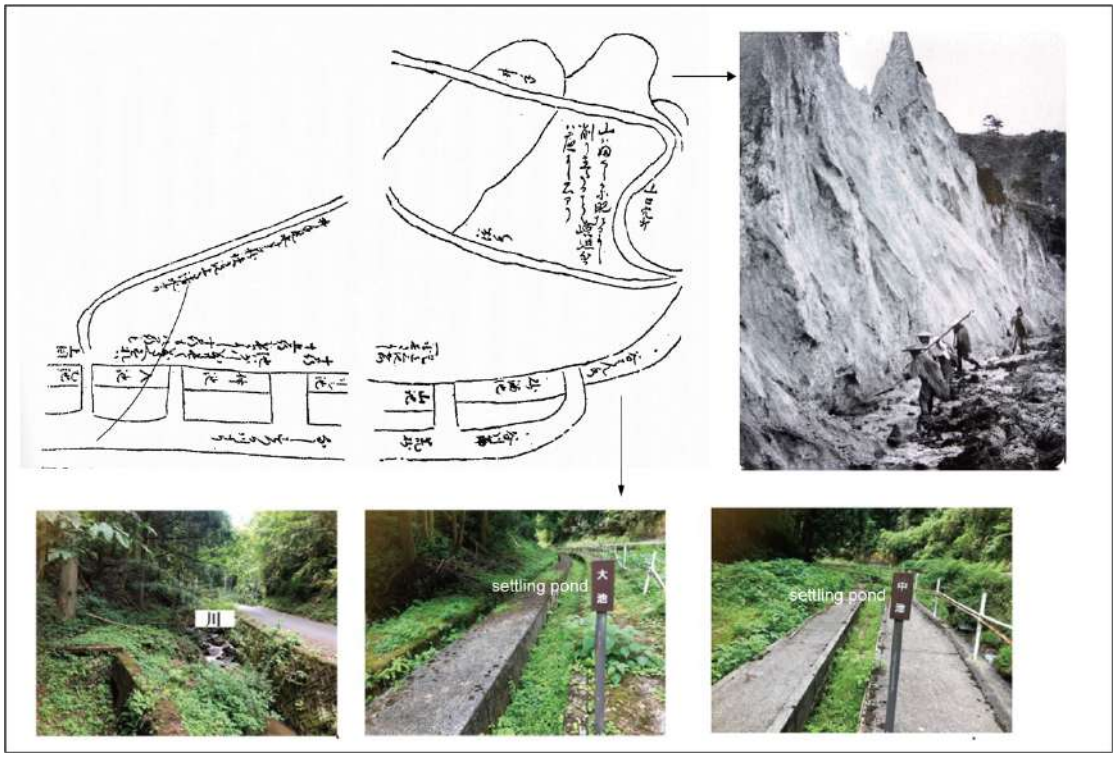


Figure 2- 10. Diagram of Tatara's operating system[27]

Due to the low content of iron sand in deeply weathered granite, it is usually necessary to excavate numerous mountainous areas to meet the demand for steel production. From the 16th to the 20th century, Kanna-nagashi significantly altered the topography of Chugokku mountainous regions. Additionally, since rivers have the capacity to transport sediment, the sand and silt excavated from upstream areas for iron production were carried downstream by various rivers, consequently altering the landscape of the lowland riverbanks. Throughout the series of Kannanagashi, the result turns that Kananagashi made a big difference to the terrain. Many scholars have done relevant research on this, such as Yoshihiko Akagi who researched the influences created by Kannanagashi on Hii River and Takahashi River. [18), 19)] In general, the Kanna-nagashi first changed the shape of the mountain by digging it up and then raises the riverbed downstream by separating mountain sand layer by layer. Although it significantly promoted and improved the economy of mountain villages at that time, it changed people's living environment due to the change of terrain and the impact on downstream villages.

[27] The Tatara's drawing picture at the top left is quoted from Reference "野原建一. (2008). たたら製鉄業史の研究. 渓水社.", the photo at the top right is quoted from Reference "雲南市たたらプロジェクト会議. (2022). 雲南のたたら文化.", and the three photos at the bottom are took by the author through the on-site investigation in 2022.

2.2.2 Characteristic 2: Historical distribution between highlands and lowlands in Chugoku Regions

Until Japan's modern transportation system was implemented, goods were transported and exchanged by horses or boats. The path of Salt Road (Shiono Michi) in the Chugoku Region can be clearly analyzed by using the distribution map of Salt Road in the late modern period to the early Meiji period compiled by Yoshio Tomioka (Figure 2-10) (Toshio Tomioka, 1978). Departing from the Seto Inland Sea, lowland goods such as salt were transported through rivers by boat to the exchange point (black point in Figure 2-10) in the first basin. Due to the difficult-to-cross mountain ridge, which is at a higher altitude, horse transport was needed to cross the mountain pass and connect to the salt route along the rivers to the north. As a result of such movements, lowlands, transit areas, and highlands can clearly be distinguished, such as the Takahashi River and Hino River.

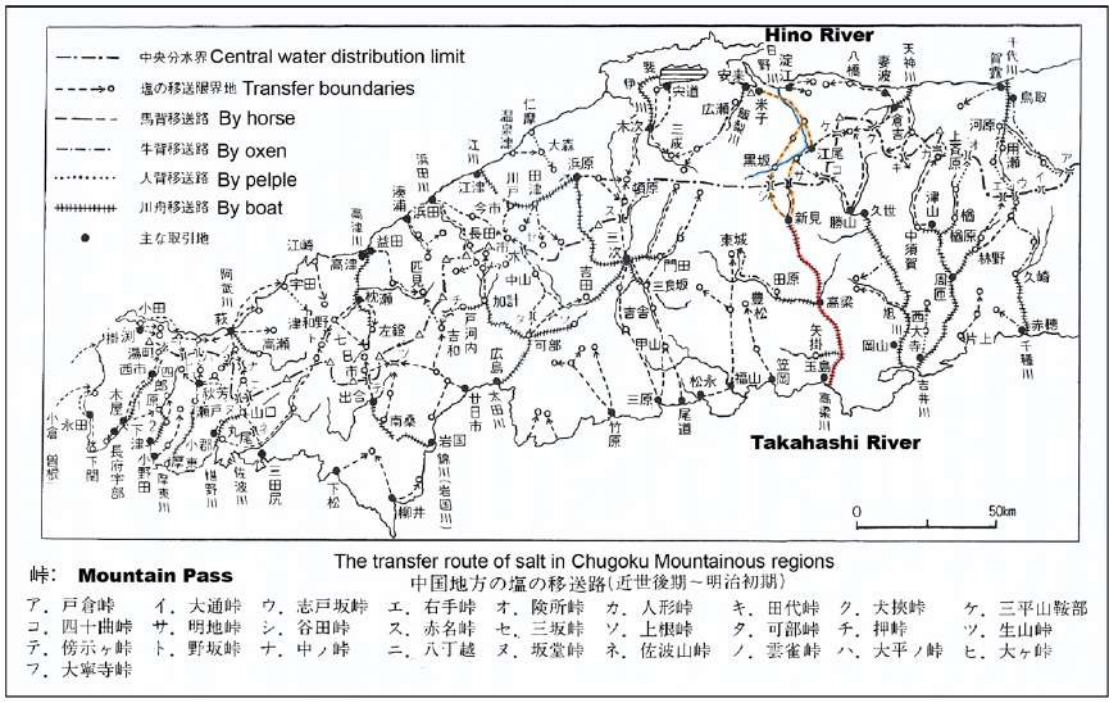


Figure 2- 11. The historical Salt-Road Route in Chugoku region[28]

2.2.3 Characteristic 3: Diverse types of hubs

Ancient transportation methods consisted of boats or horses, with low mobility and limited capacity for carrying cargo. Horses and people must rest during long-distance transportation. Consequently, rest stations appeared between the lowlands and highlands. In the later stages, these stations evolved into economic exchange hubs or settlements for labor, known as "Shukuba." Numerous hubs were established in the central part of the Chugoku region to serve as intermediary locations. More importantly, those hubs along different river basins have their characteristics. Nowadays, they serve as settlements where goods are exchanged daily.

2.2.4 Summary

Regardless of how history changes, the movement between highlands and lowlands in Chugoku Mountainous regions, caused by the unique natural resources of mountains throughout history, is precisely the focus of this study on the traditional distribution between highland and

[28] Cited from Reference "富岡 儀八. (1978). 日本の塩道 : その歴史地理学的研究. 古今書院.", p 392.

lowland settlements. However, within the entire mountainous region of Chugoku region, countless rivers can meet the conditions of water resources, transverse connectivity, and industrial development. To determine which specific river better conforms to the exchange pattern between highlands and lowlands, it is necessary to systematically examine the features of different basins to identify the ultimate research subject.

Initially, this study screened all watersheds that align with the three criteria for researching highland settlements in the Chugoku Region. Five rivers were selected, namely the Takahashi River, Hino River, Hii River, Gono River, and Ashita River, as illustrated in the figure below.

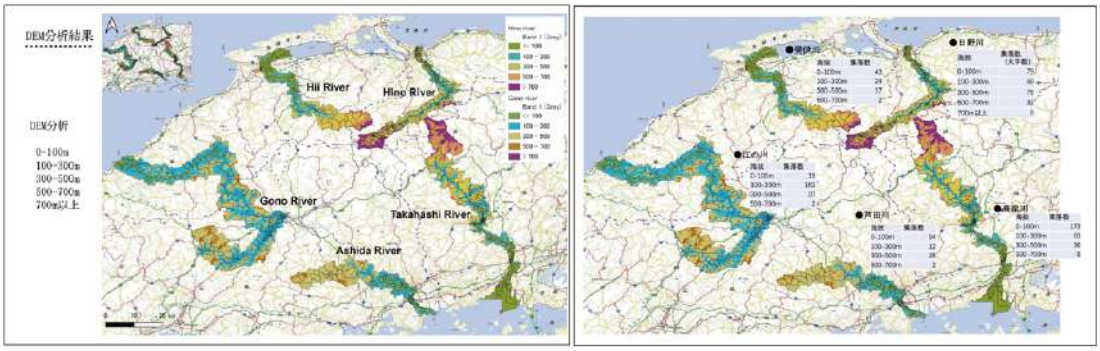


Figure 2- 12. Map of villages in the watershed[29]

A total of three field surveys were conducted during the period from June to September 2022 for this study. In the first round of rapid surveys, this study traversed Chugoku mountainous regions and visited thirty-three settlements near four rivers, gaining a preliminary understanding of the characteristics of communities. Besides, elevation processing was carried out using dem data, revealing that the Takahashi River, Hii River, and Hino River headwaters are situated in high-altitude areas. However, by examining the characteristics of industries and circulation in different river basins, it was observed that the Takahashi River and Hino River exhibit richness and diversity distinct from other rivers in terms of industrial development and circulation features.

Figure 2- 13. The diagram of site surveys[30]

Besides, elevation processing was carried out using dem data, revealing that the Takahashi

[29] Drawn by the author.
[30] Cited from Millennium Village Seminar from Nakatani Norihito Lab, Waseda University.

River, Hii River, and Hino River headwaters are situated in high-altitude areas. However, by examining the characteristics of industries and circulation in different river basins, it was observed that the Takahashi River and Hino River exhibit richness and diversity distinct from other rivers in terms of industrial development and circulation features.

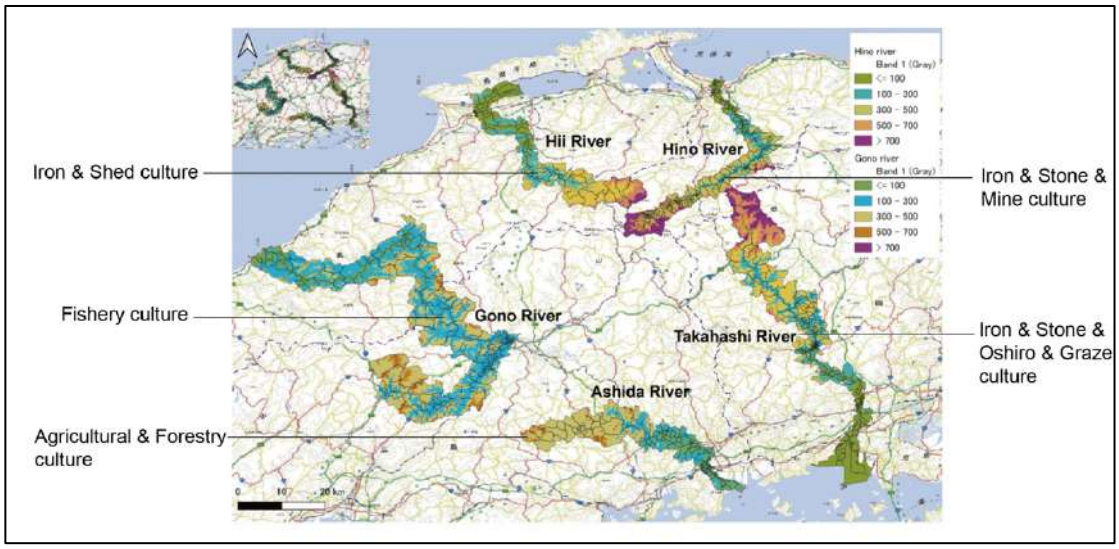


Figure 2- 14. The characteristics of five preselected rivers

Due to the emphasis of this study on circulation between highland and lowland areas, regions with a wider variety of circulation patterns and items better align with the research perspective. Therefore, this study ultimately selected the Takahashi River and Hino River watersheds as the focus of investigation.

2.2.5 Basic information of ultimate research objects: the Takahashi River and Hino River

It has been determined that the granite distribution regions of the Chugoku Mountains encompass the upper reaches of the Takahashi River and Hino River. This geographical placement has led to the upstream villages historically developed the Tatara system. Notably, Chiya Village, positioned at Takahashi River with an elevation of 700 meters above sea level, stood as the most upstream settlement and played a pivotal role as one of the primary iron-producing hubs along the Takahashi River before the Edo period. In the Hino River basin, Neu was the first settlement to develop the Tatara iron-making industry. Following the demise of the Tatara system, a chromium mine was opened in the Tari region (with an elevation of 600m) upstream of the Hino River during the Meiji period (around 1905). At its peak, it was the largest chromium mine in Japan. Due to the unique operation of the Tatara iron-making industry, the highland settlements upstream are closely connected with the lowland settlements on the plains in an inseparable manner. This close connection is not only reflected in the distribution path of iron products from upstream that need to be transported downstream and then delivered to various parts of Japan; it also directly manifests in the connection between the “terrain changes” caused by the iron- manufacturing industry and the changes in the terrain affecting the lower lowlands. For example, scholars have conducted extensive and detailed research on the impact of historical Tatara on downstream settlements (Sadakada, 1988). The shapes of the two rivers, from the Meiji era to the present, have undergone significant changes due to the Tatara industry, as seen in the case of the Takahashi River (Figure 2-12).

Taking the Takahashi River as an example, downstream villages encountered various issues due to the development of iron production upstream, such as river course redirection and the emergence of new fields due to sediment accumulation. The sediment produced by the Tatara iron system in Chiya has significantly impacted the terrain of downstream villages, precipitating several issues, most notably recurring flooding problems. For the sake of flooding problems, the existence of the iron industry led to a constant state of antagonism between the upper and lower river villages. The sediment-related issues stemming from upstream Tatara iron production necessitated downstream interventions to address the elevation of the riverbed. Over time, this transformed the Takahashi River, originally featuring both eastern and western tributaries, into a single primary tributary on the western side, as depicted in the provided illustration (Figure 2-10)

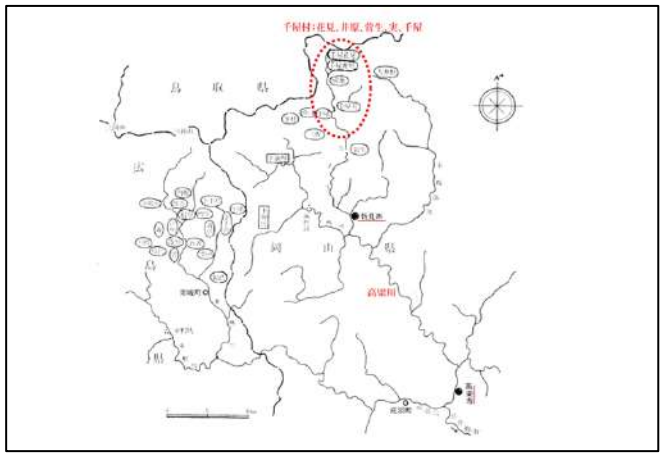


Figure 2- 15. Location map of the village where Kananagshi was conducted in the upstream of Takahashi River[31]

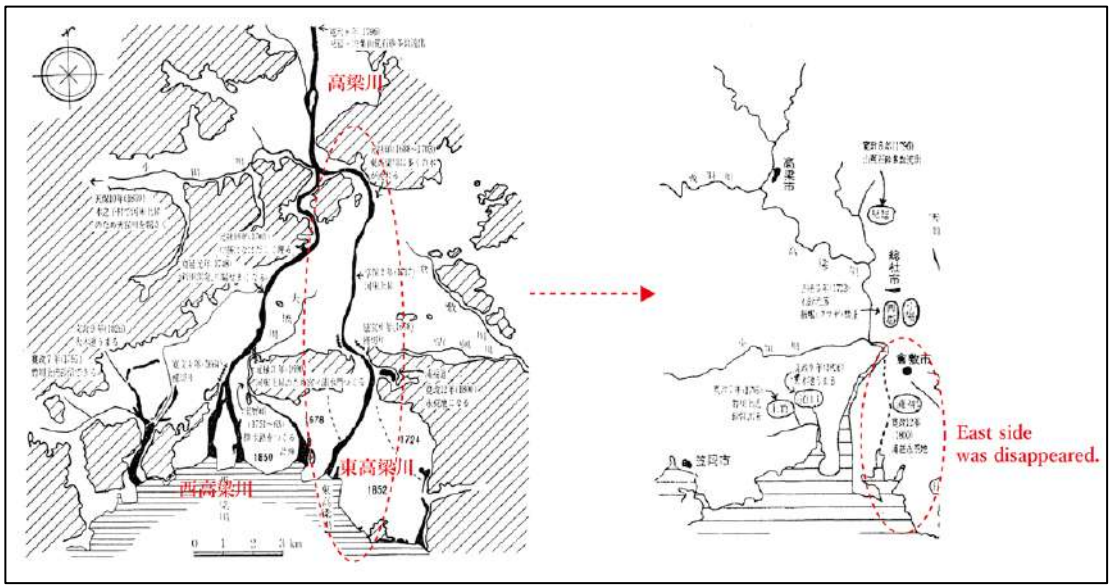


Figure 2- 16. The changing historical paths of Takahashi River[32]

[31] Cited from Reference "赤木祥彦, & 貞方昇. (1988). 高梁川流域の鉄穴流しによる地形改変と水田開発. 人文地理, 40(3), 197-220."
[32] Cited from the same source as above.

Figure 2- 17. Comparative map of changes of Takahashi River[33]

In the region of the Takahashi River, Niimi City serves as the region's economic center. Several settlements are located along the Hino River, including Shin Yama, Tari, Neu, and Ebi, which was developed as a post town or economic center due to the mines. The circulation of goods between highlands and lowlands existed before transportation routes were established along the Takahashi River and Hino River. Therefore, based on the perspective of historical circulation, this study selects the Takahashi River and Hino River as the research subjects for the Chugoku Mountainous Regions.

Through a review of the history and changes in Chugoku mountainous industry development, this chapter analyzes how highland residents, primarily reliant on mountainous resources, operated their livelihoods and how their industrial growth affected the living environment of lowland inhabitants. The influx of activity from the prosperous period of the Tatara iron industry extended beyond transporting quality iron products through rivers to various regions of Japan. Tatara system also attracted a considerable number of ironworking engineers from different areas due to the abundance of resources in the highlands. These engineers settled in communities near mining areas, leading to trade and commerce within these settlements (e.g., as seen in the Tari settlement along the Hino River). During that time, the iron industry not only linked the highlands and lowlands but also transcended the limitations imposed by the mountainous terrain. Now that the iron industry has exited the historical stage, the interaction between upland and lowland communities in Chugoku mountainous regions seems less apparent. This study is grounded in understanding the historical changes in Chugoku industries and aims to explore whether interactions persist between highland and lowland settlements in contemporary times. Do the settlements located at the highest altitudes

[33] Reedited by the author. All the base maps are cited from the Geospatial Information Authority of Japan.

and closest to mountain resources, at the watershed's headwaters, still retain the characteristics of highland communities? These are the central questions this section aims to address.

2.2.6 Selections of research objects

Considering the outcomes of the two rounds of research and the historical distribution in the Takahashi River and Hino River, both two rivers were selected as the primary subjects for conducting an investigative study into upland settlements within the Chugoku mountainous regions. The number of selected research settlements was eventually narrowed to 12, encompassing altitudes ranging from nearly 700 meters above sea level to lowland settlements situated only 4 meters above sea level at their estuaries. The selected settlements represented three main industrial categories: agricultural, livestock-based, and historical or modern economic centers. In terms of traditional significance, they included Tatara iron-making settlements and labor-intensive gathering communities.

Table 2- 1. Summary table of research villages[34]

No.	Name of village	Elevation (m)	Established era	Settlement Characteristics
1	井倉 Ikura	410	Modern Times	Limestone zone, located at Takahashi River meander belt.
2	足見 Tarumi	400	Modern Times	Limestone zone, located at Takahashi River meander belt.
3	新見市中心部 Centeral part of Niimi city	180	Ancient Times	Economic center, former departure point for Takahashi River boat transport
4	千屋実 Chiya Sane	450	Modern Times	Granite zone, former iron smelting site (Kanna-nagashi)
5	千屋井原 Chiya Ihara	490	Modern Times	Granite zone, former iron smelting site (Kanna-nagashi)
6	千屋花見 Chiya Hanami	600	Modern Times	Granite zone, former iron smelting site (Kanna-nagashi), current has a pasture
7	神戸上 Kadonokami	580	Ancient Times	Junction of Hino River and Takahashi River transportation, former iron smelting site (Kanna-nagashi), millennium village
8	新屋 Niiya: 多里 Tari、野組 Nogumi、新山 Shinyama	480	Modern Times	Upper reaches of Hino River, former mining area, and Tari was a mining town in Tari
9	根雨 Neu	210	Modern Times	Economic center, former post town, economically structured village along the Salt Road and Hino Kaido, the first settlement to initiate Tatara ironmaking
10	江尾 Ebi	150	Medieval Times	Economic center, former post town
11	貝田 Kaida	300	Modern Times	Settlement below Oyama Volcano
12	富吉 Tomiyoshi	4	Medieval Times	Flatland settlement in the lower reaches of Hino River, village developed based on the coastal form in the past

2.3.1 Analysis Method

The research methodology for the case study encompassed two distinct phases: an initial literature review and subsequent on-site investigations. During the preliminary literature review, essential settlement details such as population, area, and historical background were gathered. Data regarding the village's ground, structure, and community was gathered during the field research stage. Ultimately, the survey results were presented as a table for a horizontal comparison of all villages, as shown in Figure 2-18.

[34] Managed by the author.

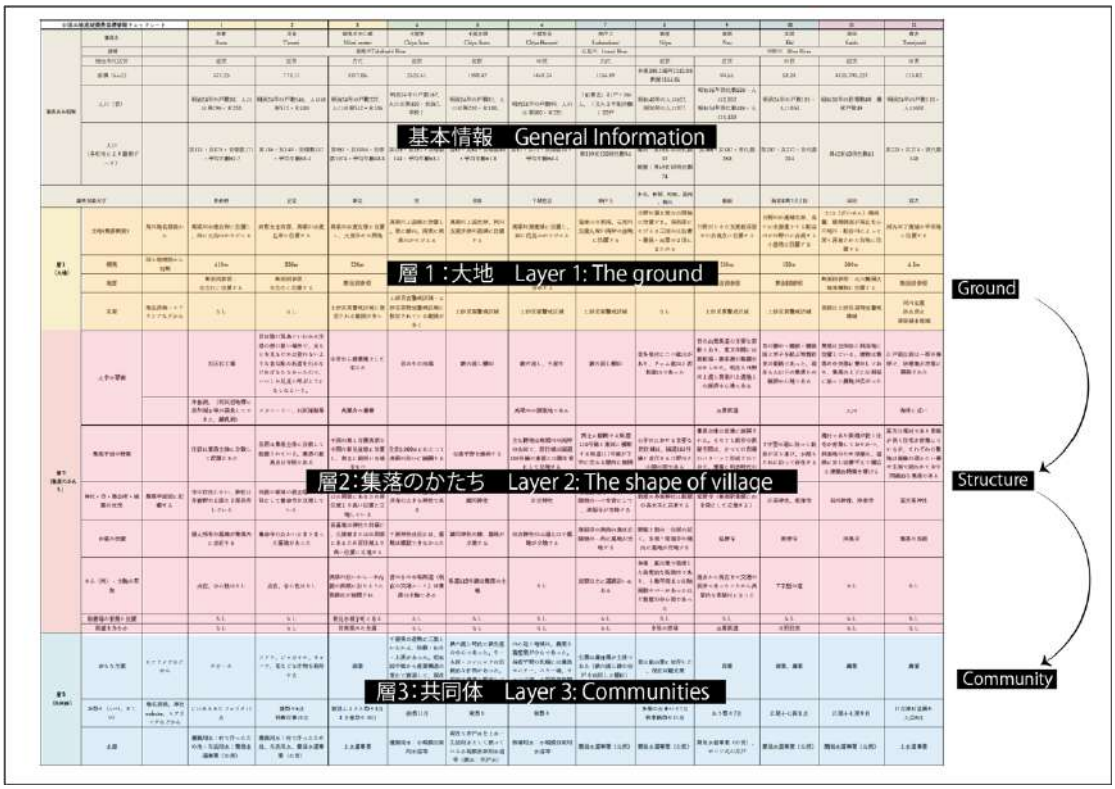


Figure 2- 18. Schematic diagram of the Settlement Analysis Cards (SAC)[35]

2.3 Research Results

The on-site investigation method concentrated on geography, settlement morphology, and community aspects. By completing detailed forms for each settlement, the following two theoretical hypotheses were aimed at being addressed.

Are high-altitude settlements inherently equal to highland communities?

Do settlements situated at intermediate altitudes but with vertical separation possess the characteristics of upland communities?

After conducted on-site investigation, Settlement Analysis Cards (SAC) were generated to dissect the attributes of the survey subjects. The specific composition of SAC is as shown Figure 2-16[36]. In addition, the sectional diagram from the watershed perspective has also been completed, as shown in Figure 2-17 [37].

[35] Drawn by the author.
[36] Designed & Drawn by the author.
[37] Drawn by the author.

中国山地流域調査基礎情報チェックシート			1	2	3	4	5	6	7	8	9	10	11	12
集落基本情報	集落名		井倉 Ikura	足見 Tarumi	新見市中心部 Niimi center	千屋実 Chiya Sane	千屋井原 Chiya Ihara	千屋花見 Chiya Hanami	神戸上 Kadonokami	新屋 Niiya	根雨 Neu	江尾 Ebi	貝田 Kaida	富吉 Tomiyoshi
	流域		高梁川Takahashi River						石見川　Iwami River	日野川　Hino River				
	初出年代区分		近世	近世	古代	近世	近世	中世	古代	近世	近世	中世	近世	中世
	面積（km2）		571.25	773.11	1377.06	2525.61	1398.47	1469.24	1156.09	多里308.2湯河1242.08 新屋1844.06	94.65	53.38	4135.795.227	115.82
	人口（昔）		明治24年の戸数80，人口は男296・女253	明治24年の戸数146，人口は男512・女480	明治24年の戸数227，人口は男542・女536	明治24年の戸数167，人口は男430・女367，学校１	明治24年の戸数81，人口は男210・女180。	明治24年の戸数99，人口は男300・女231	「伯耆志」31戸・161人，「文久３年組合帳」32戸	昭和40年の人口622，同50年の人口377	昭和35年世代数508・人口2,052 昭和54年世代数446・人口1,489	明治24年の戸数181・人口854	昭和33年の世帯数49，農家戸数49	明治24年の戸数110・人口608
	人口 （各町市により最新データ）		男171・女175・世帯数171・平均年齢57.7	男136・女149・世帯数117・平均年齢58.4	男957・女1094・世帯数1074・平均年齢48.8	男125・女151・世帯数144・平均年齢63.1	男59・女68・世帯数60・平均年齢61.8	男67・女71・世帯数70・平均年齢64.4	男109女130世代数94	多里：男60女78世代数67 湯河：男35女41世代数37 新屋：男69女89世代数74	男266・女387・世代数258	男237・女277・世代数204	男62女68世代数41	男228・女274・世代数148
調査対象大字			**井倉野**	**足見**	**新見**	**実**	**井原**	**千屋花見**	**神戸上**	**多里、新屋、野組、湯河、新山**	**根雨**	**海老本町1-5丁目**	**貝田**	**富吉**
層１ （大地）	立地(集落概要)	角川地名辞典から	高梁川中流右岸に位置し、西に大坊山がそびえる	阿哲台北西部、高梁川中流左岸に位置する	高梁川中流右岸に位置し、大部分が山間地	高梁川上流域に位置し、東に雄山、南東に剣森山がそびえる	高梁川上流左岸、同川支流井原川流域に位置する	高梁川源流域に位置し、西に花見山がそびえる	鬼林山の東南、石見川支流九塚川南岸の盆地に位置する	日野川最上流の山間地に位置する。南西部にそびえる三国山は伯耆・備後・出雲の３国にまたがる	日野川とその支流板井原川の合流点に位置する	日野川中流域右岸、烏ケ山を源流とする船谷川が日野川に合流する小盆地に位置する	大山（だいせん）南西麓，緩傾斜面が南北を小江尾川・船谷川によって深く浸食された台地に位置する	河内川下流域の平坦地に位置する
	標高	国土地理院から判断	410m	380m	220m	433m	560m	600m	420m	550m	210m	150m	300m	4.3m
	地質		断面図参照： 古生代に位置する	断面図参照： 古生代に位置する	断面図参照	断面図参照	断面図参照	断面図参照：花崗岩帯に分布する	断面図参照	断面図参照	断面図参照	断面図参照	断面図参照：火山麓扇状地堆積物に位置する	断面図参照
	災害	地名辞典・ヒアリングなどから	なし	なし	土砂災害警戒区域に指定される範囲が多い	土砂災害警戒区域・土砂災害特別警戒区域に指定されている範囲が多く	土砂災害警戒区域	土砂災害警戒区域	土砂災害警戒区域	なし	土砂災害警戒区域	土砂災害警戒区域	東側は土砂災害特別警戒地域	河川氾濫 洪水浸水 津波浸水地域
層２ （集落のかたち）	大字の要素		石灰石工場	昔は陸の孤島といわれる交通の便の悪い場所で、足もとを見なければ登れないような急勾配の坂道を行かなければならなかったので，いつしか足見と呼ぶようになったという。	中世から商業地として栄えた	昔の牛の市場	鉄穴流し棚田	鉄穴流し、千屋牛	鉄穴流し棚田	昔多里村に二つ鉱山があり、クロム鉱山と若松鉱山であった	昔の出雲街道の主要な宿駅であり、寛文年間には渡船場・御茶屋の整備がはかられた。現在も日野川上流と高梁川上流地との経済中心地である	昔の備中・備前・備後国と米子を結ぶ物資往来の要路であった。現在も大山下の集落との経済中心地である	集落は全体的に斜面地に位置している。建物は集落の中央部に集中しており、集落の上下には斜面に沿って農地が広がった	江戸期以前は一帯が海岸で、砂堆地が次第に開発された
			井倉洞。（石灰岩地帯に長年雨水等が浸食してできた、鍾乳洞）	メガソーラー、石灰採掘場	高瀬舟の遺構			高梁川の源流地である			出雲街道		大山	海岸に近い
	集落平面の特徴		住居は集落全体に分散して配置された	住居は集落全体に分散して配置されている。集落の最高点は寺院である	中国山地と吉備高原の中間の新見盆地に位置し、南北に細長い市域をもつ	全長6,000mにわたって高梁川沿いに展開する	谷底平野を傾斜する	主な耕地は高梁川の両岸の水田で、居住域は国道180号線の東側に山際を背にして立地する	南北に縦断する県道210号線と東西に横断する県道111号線がT字に交わる箇所に展開された	小字内における主要な居住域は、国道183号線と並行する日野川と山際の間である	集落全体は低地に展開された。そのうち既存の街路空間は、かつての宿場のパターンで形成されており、建築に明治時代のスタイルを残す	T字型の道に沿って民家が立ち並び、水路もそれに沿って存在する	塊村であり街路が狭く住宅が密集しておりかつ、斜面地のため母屋は、道路に対し切妻平入で横広な建築的特徴を帯びる	冨吉は塊村であり街路が狭く住宅が密集しているが、それぞれの敷地は視線の通らない塀や生垣で囲われており閉鎖的な集落である
	神社・寺・集会所・城館の状況	集落平面図に記載する	寺は存在しない、神社は井倉野の上部と下部共有していた	西側の領域の最北端に山を背にして養命寺が立地していた	各神社は、丘陵地または山間部にあるため居住域より高い位置に立地している	千屋神社は千屋地方の共有の大きな神社である	國司神社	日吉神社	谷底盆地内の島状の丘陵地の一つを背にして、珠福寺が立地する	新屋の多里神社は新屋の各大字に共有する	延暦寺（根雨駅東側に山を背にして立地する）	江美神社、東祥寺	貝田神社、浄楽寺	冨吉荒神社
	お墓の位置		個人所有の墓地が集落内に点在する	養命寺の向かいにまとまった墓地があった	各墓地は神社と同様に、丘陵地または山間部にあるため居住域より高い位置に立地する	千屋神社付近には、墓地は確認できなかった	國司神社の隣、墓地が立地する	日吉神社の山道入口で墓地が立地する	珠福寺の南西の島状丘陵地の一角に墓地が立地する	野組と新山：住居の近く。多里：常福寺の境内に墓地が立地する	延暦寺	東祥寺	浄楽寺	集落の西側
	中心（性）・主軸の有無		点在、中心性はなし	点在、中心性はなし	高梁川沿いから一本内側の街路に沿うように街路村が展開され	昔の牛の市場街道（現在の交通ルート）は集落の主軸である	県道443号線は集落の主軸	なし	民家は主に道路沿いにある	多里：鉱山業で発達した典型的な街路村であり、十数年前までは映画館やバーがあったほど新屋の中心街であった	過去から現在まで交通の要所であったことから典型的な街路村になった	T字型の道	なし	なし
	船着場の有無と位置		なし	なし	新見市城下町にある	なし	なし	なし	なし	なし	なし	なし	なし	なし
	街道を含むか		なし	なし	昔高梁川の舟運	なし	なし	なし	なし	多里の宿場	出雲街道	日野往来	なし	なし
層３ （共同体）	おもな生業	ヒアリングなどから	ビオーネ	ブドウ、ジャガイモ、キャベツ、花などな作物を栽培する	商業	千屋実の産物に三黒といわれる，砂鉄・和牛・木炭があった。昭和30年頃から産業構造の変化で衰退して、現在農業は主な収入源である	鉄穴流し時代に鉄生産の中心であった。牛・木炭・コンニャクの伝統的な作物があった。現在は農業と観光レジャー産業	山に近く地域は、農業と畜産業が中心であった。谷底平野の先端には養魚センター、スキー場、キャンプ場、大型温泉旅館など観光業であった	生業は農林業が主体である（鉄穴流し跡の谷戸を利用した棚田）	昔は鉱山業に依存した、現在は観光業	商業	商業、農業	農業	農業
	お祭り（いつ、どこで）	地名辞典、神社website、ヒアリングなどから	にいみもみじフェスタ11月	夏祭り6月 神輿行事10月	新見ふるさと祭り8月 土下座祭り10月	例祭11月	秋祭り	秋祭り		多里の火まつり7月 秋奉納祭り11月	ねう祭り7月	江尾十七夜８月	江尾十七夜９月	日吉津村盆踊り大会8月
	水源		灌漑用水：村で作ったため池：生活用水：簡易水道事業（公営）	灌漑用水：村で作ったため池、生活用水、簡易水道事業（公営）	上水道事業	灌漑用水：小規模自家用水道等	現在も井戸水を上水・生活用水として使っている小規模自家用水道等（原水：井戸水）	牧場用水：小規模自家用水道等	簡易水道事業（公営）	簡易水道事業（公営）	簡易水道事業（公営）、ポンプ式の井戸	簡易水道事業（公営）	簡易水道事業（公営）	上水道事業

Figure 2- 18. Settlements Analysis Card (SAC) in Japan

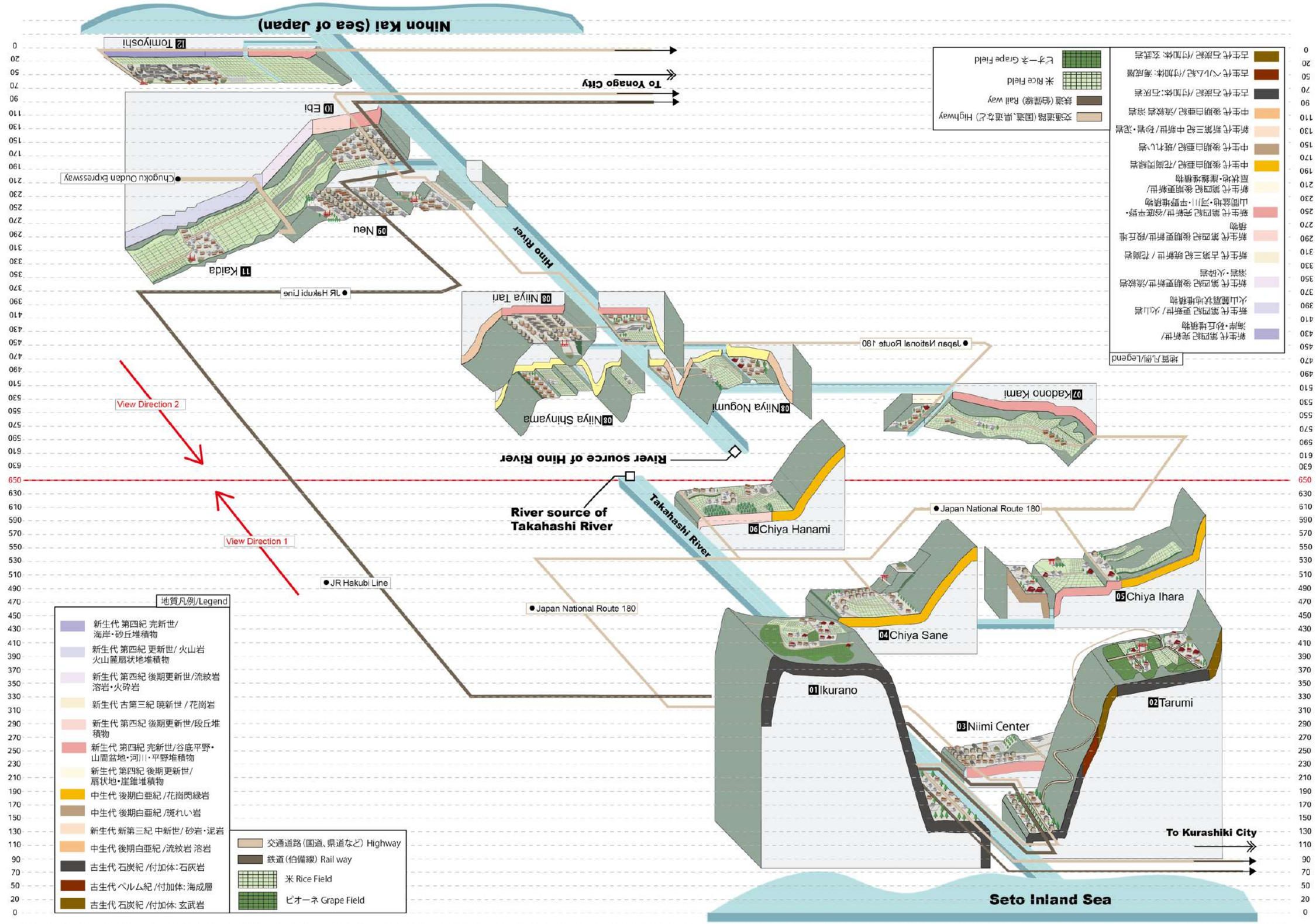


Figure 2- 19. Cross-sectional map of villages in Japan

Based on the results presented in the village analysis table and 3D cross-sectional diagrams, this study preliminarily draws the following three conclusions:

①. Highland settlements are not equivalent to high-altitude settlements.

②. The vertical distance of highland settlements has contributed to their isolation due to the challenge of establishing transportation connections.

③. A very discreet yet widespread interactive connection exists between the highlands and lowlands.

The following explanations are provided for the three hypotheses mentioned above:

2.3.1 Highland settlements are not equivalent to high-altitude settlements: The comparison between Tarumi and Hanami

Regarding altitude, the Hanami settlement located at the upper reaches of the Takahashi River has an overall altitude of close to 600 meters. Hanami is classified as a highland settlement according to the current definition system, which classifies settlements above 500 meters as such. With an elevation of only 410 meters, the Tarumi settlement does not meet the criteria for a highland settlement. However, during the actual research, it was discovered that the Hanami settlement, due to its vital accessibility through transportation networks such as railways and highways, has promoted the development of the tertiary sector. The sense of remoteness in Hanami as upland settlements has been shattered by the development of transportation links.

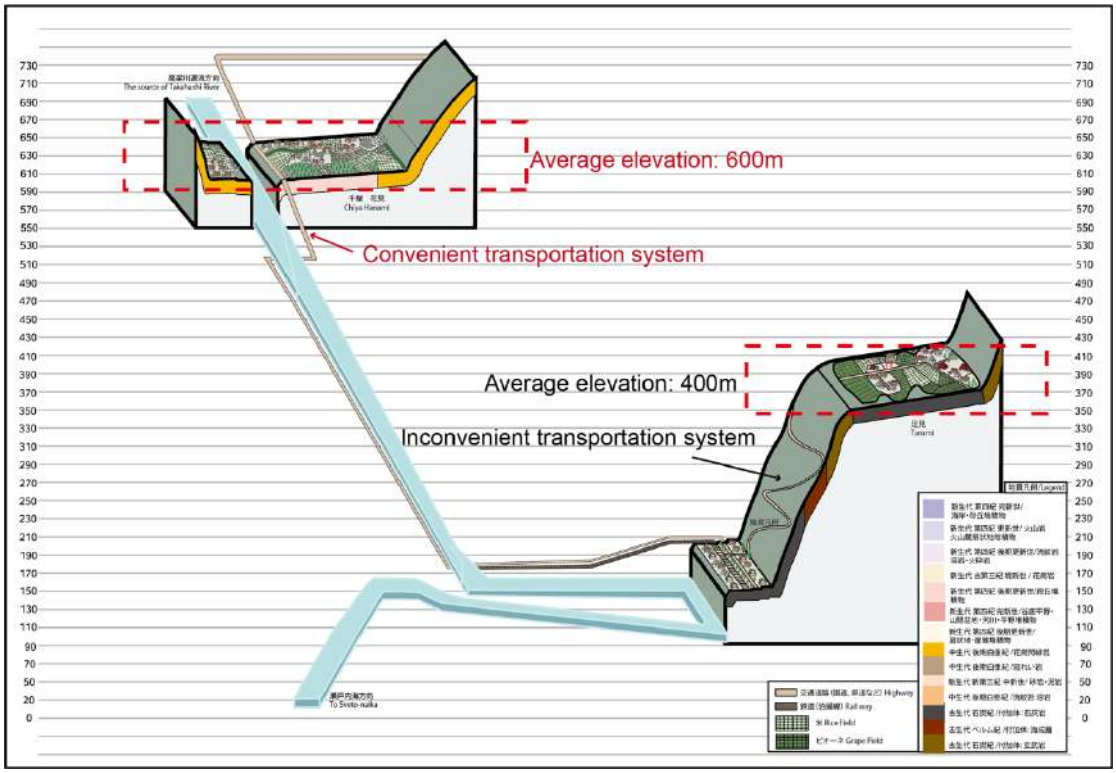


Figure 2- 21. Comparison diagram of Hanami and Tarumi[38]

[38] Drawn by the author.

The variations in transportation accessibility have resulted in two clear distinctions between the two settlements:

- Settlement Structure: The higher-altitude Hanami has a more expansive settlement structure, while the topography of the mountain peak notably constrains the settlement structure of Tarumi.
- Industrial Development: The advancement of transportation has created extensive prospects for expanding Hanami's economic sectors that it's industries have transformed from its initial Tatara iron production to forestry, livestock, and tourism. In the valley bottom plain of Hanami near the headwaters, a fish farming center, ski resort, campground, and sizeable hot spring inn have been built, indicating foresight toward tourism and trade. Conversely, Tarumi has predominantly witnessed shifts in cultivated crop varieties (according to interview), maintaining its primary focus on agriculture.

Furthermore, the name "Tarumi" itself reflects its historical inaccessibility. As the Kadokawa Dictionary of Place Names documented, Tarumi was once likened to a secluded island with challenging transportation access. Inhabitants had to ascend steep slopes while gazing at the ground below, which is how the moniker "Tarumi" originated, signifying "watching the feet." Therefore, comparing the two settlements, it can be concluded that highland settlements differ from high-altitude settlements.

2.3.2 Verticality of Highland village

The watershed sectional map clearly shows the structure and shape of each settlement and indicates the "Height" of highland settlements is not only about the concept of elevation, but also refers to the vertical elevation difference. The overall settlement structure of Chiya Hanami, which is the highest settlement in the Takahashi River basin, is semblable for the villages in the lower reaches of the Hino River. This is precisely because the main road of traffic passes through the middle of the settlements, thus breaking the sense of detachment of the high-altitude settlements. However, the two settlements Ikurano and Tarumi located on the top of the limestone mountain are separated from the river basin by an altitude difference of nearly 250 meters from the vertical elevation of the mountain below, although they are only 400 meters above sea level (Figure 2-19).

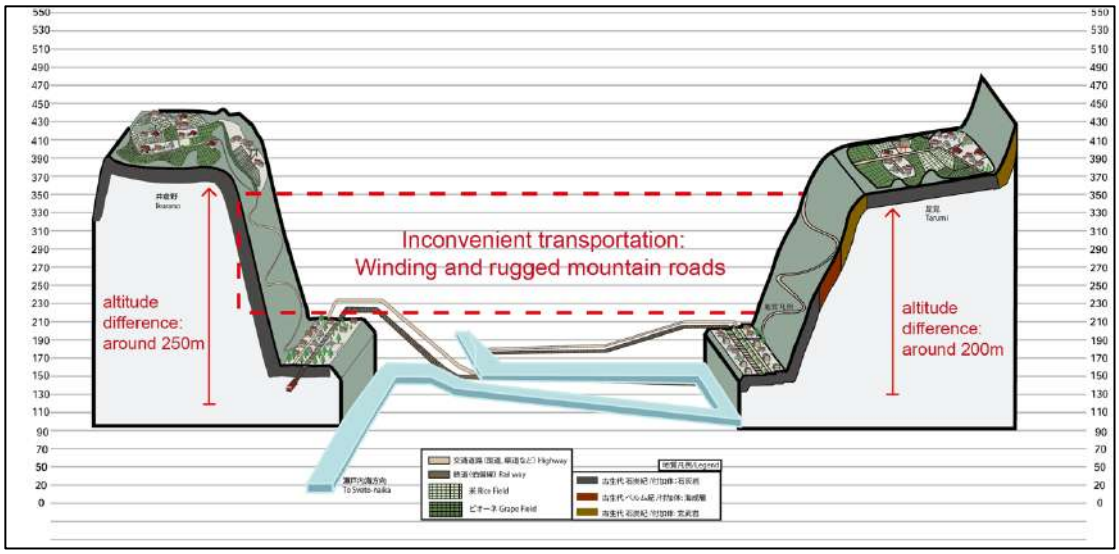


Figure 2- 22. Section diagram of Ikura and Tarumi[39]

The vertical distance gives the settlement a sense of detachment from the river basin. The foregoing analysis also confirmed that both settlements are located at the top of mountains while having a very complete domestic water system and abundant sunlight, which is full of necessary natural resources for residents to alive. Furthermore, the abrupt elevation changes have led to the necessity of constructing transportation routes on steep slopes, resulting in the roads becoming winding and rugged mountainous paths. Sufficient vertical elevation difference can fully enable the settlements to be independent of other living systems, hence completely presenting a sense of highland. In addition, villagers use their wisdom to build their own complete living space, which is associated with the lowland settlements on the necessary living materials. A highland living system is thus formed.

2.3.3 The interactive connection exists between the highlands and lowlands: from the view of river basin

Alongside assessing the settlement structure, it is imperative to account for the circulation dynamics among watershed settlements to explore the interactive model between highland and lowland areas. Within the Takahashi River valley basin, two prominent urban centers, Niimi City and Takahashi City, stand out as economic hubs due to their comprehensive amenities and economic structures. Meanwhile, in the Hino River Basin, the former Shukuba (post towns) like Neu, Ebi, and Tari are pivotal points for economic activities and transactions. Therefore, the residents' purchasing habits were examined during on-site investigations. The following diagram was drawn based on the residents' responses and the map displaying vehicle travel times.

[39] Drawn by the author.

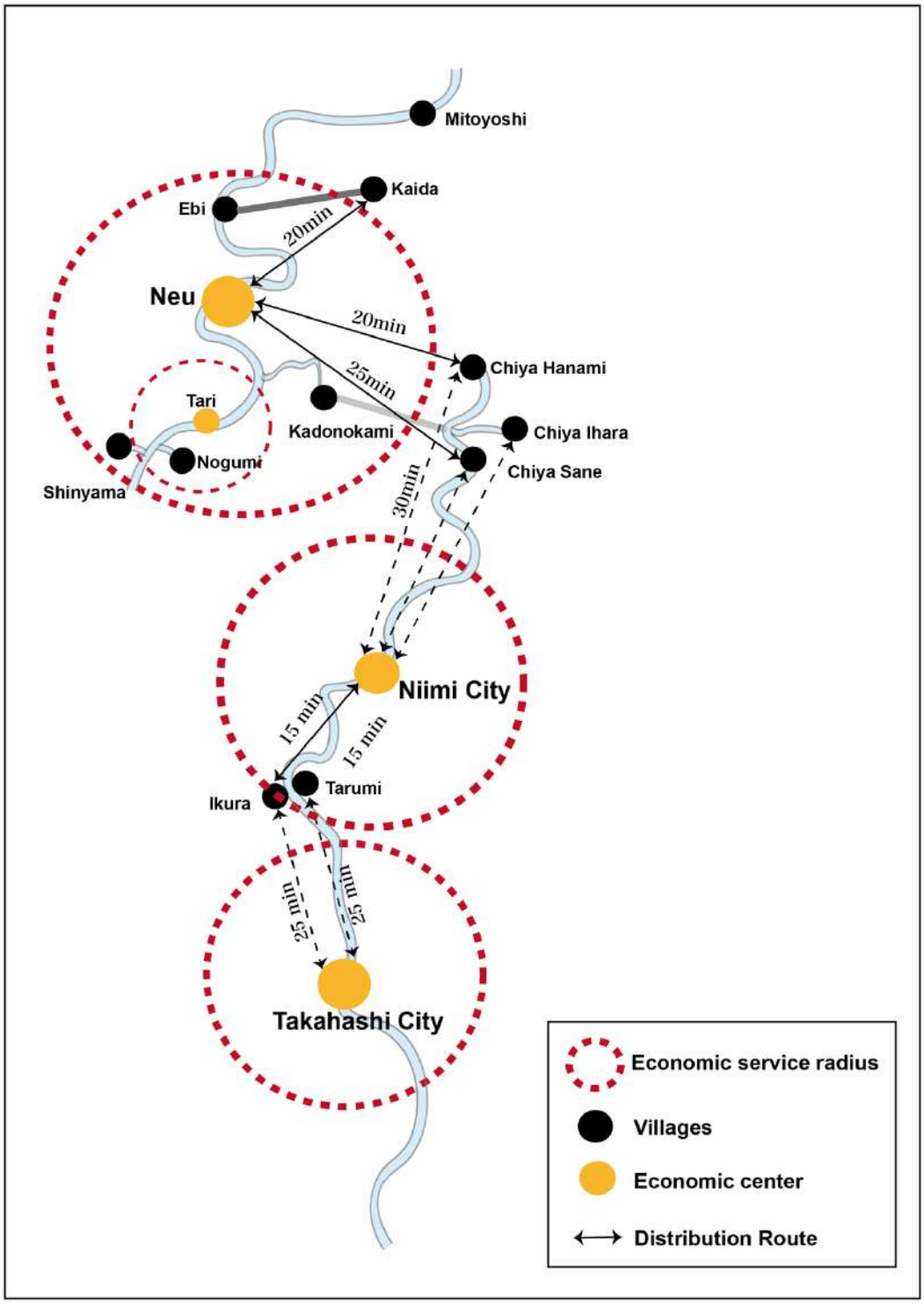


Figure 2- 23. Simplified diagram of the service radius of the economic center[40]

Neu plays a very important economic role in both basins. Highland villagers in the uper reaches of the Takahashi River also come to Neu to buy necessities. As a whole, highland settlements are basically on the edge of each economic circle, including Ikura and Tarumi, etc. They are located at a distance from the lowland economic centers but have sufficient conveniences to ensure the

[40] Drawn by the author.

exchange of their necessities. Though this exchange pattern is almost invisible today, it can still be detected through site surveys and interviews. The reason for the inconspicuous barrier can be concluded as the trains, automobiles, and other tools in the developed society have met the communication between the highlanders and lowlanders.

2.3.4 Distribution of crops in the research area

During the Tatara era, the circulation between high and lowland settlements along two rivers was easily distinguishable. It was due to the abundance of natural resources in highland settlements that could be converted into industrial forms, while lowland settlements were more inclined to use natural resources. Agriculture has now replaced the unique mountainous resource advantage of the Tatara era—highland and lowland settlements engaged in agriculture exchange goods and crops, which is difficult to distinguish.

Through organizing and researching the types of products produced in settlements and their circulation patterns, it has been observed that settlements that originally had abundant mountainous resources have transformed into agricultural providers. They continuously supply products cultivated on their land to the surrounding trade centers. A modern distribution structure has formed, as shown in Figure 2-23.

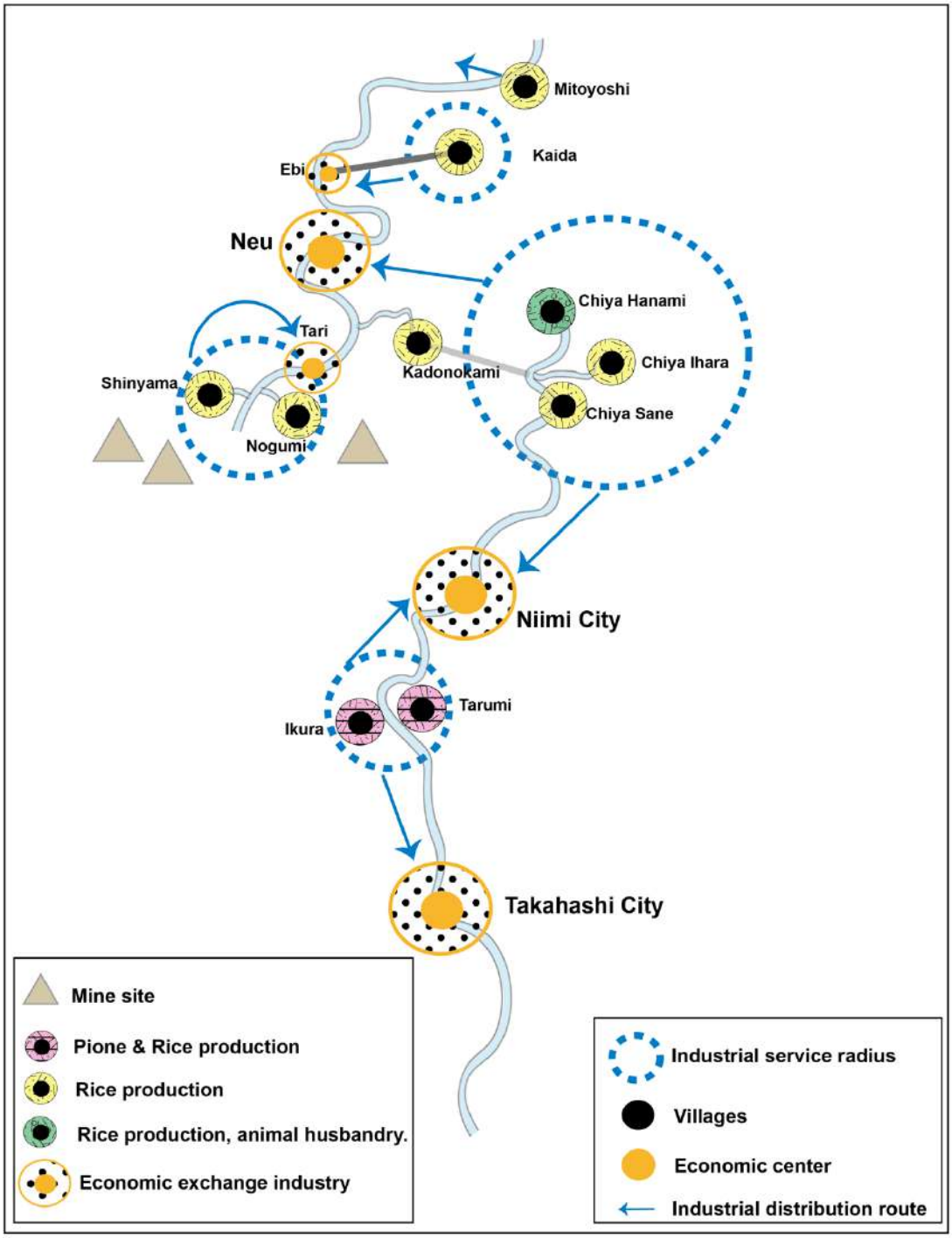


Figure 2- 24. Simplified diagram of industrial distribution route

Ikura and Tarumi, two highland settlements, are different from other settlements that primarily cultivate rice. The two settlements also cultivate a type of grape called Pione, which is more suitable for cold climates than ordinary grapes. Pione cultivation generally requires several conditions: low temperatures, significant day-night temperature differences, 800-900mm of precipitation, and ample sunlight. Ikurano and Tarumi fulfill all the essential conditions based on their topographical features, which can be observed in the cross-sectional diagram in Figure 2-24.

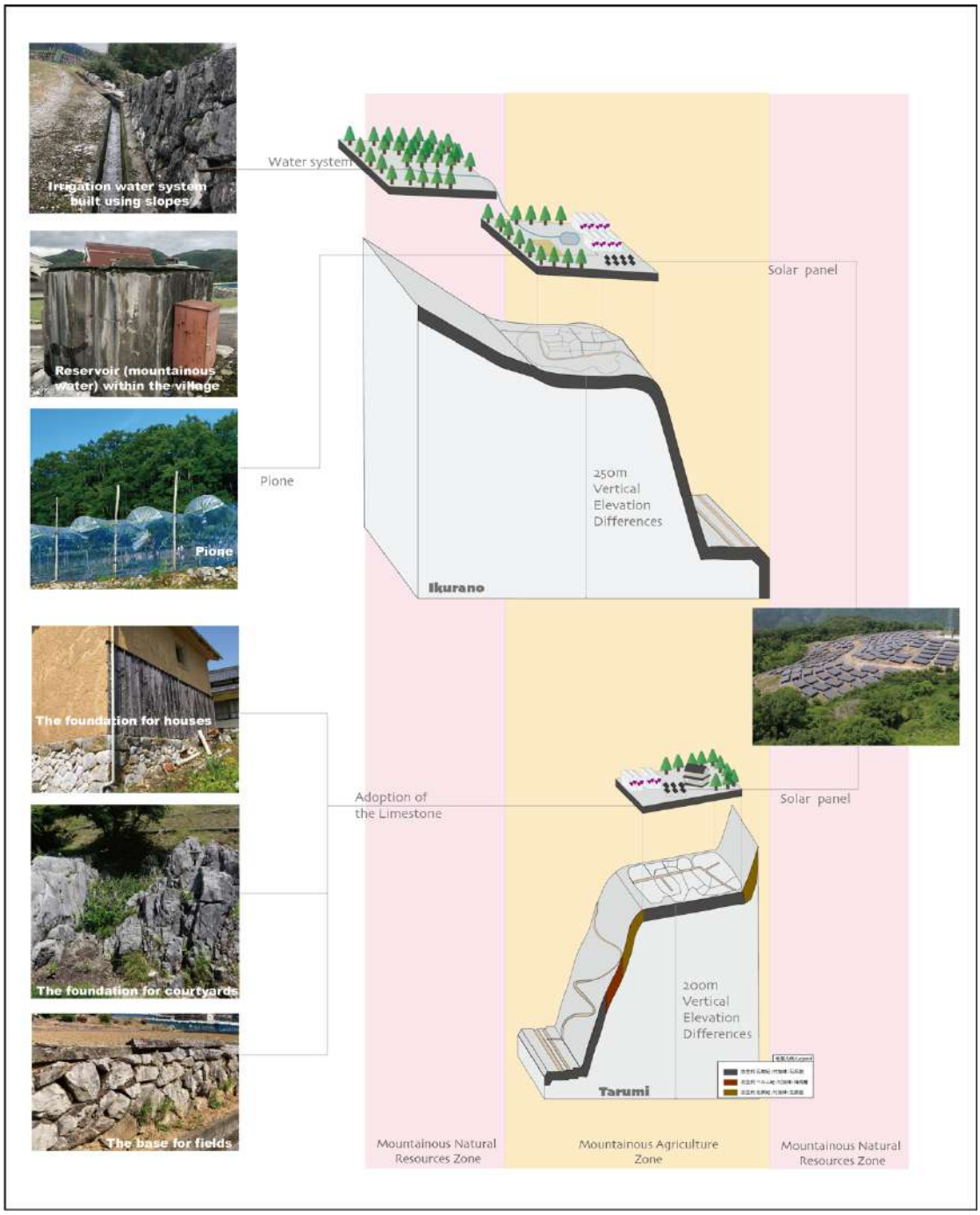


Figure 2- 25 . The livelihoods within Japanese Highland settlements

The altitude difference of over 200 meters creates significant day-night temperature variations in the settlement's geographical form, distinguishing it from other settlements. Furthermore, both settlements are located on mountain plateaus. As opposed to valley settlements, which receive limited sunlight throughout the day, plateau settlements receive continuous sunlight. Therefore, this makes Ikura and Tarumi ideal locations for solar power generation. The settlement's positioning, form, and composition maximize Pione's growth environment. The investigation also revealed that residents of Ikura and Tarumi settlements sustain their daily lives by utilizing the natural resources of the mountains. Taking advantage of the terrain slope, villagers channel mountain spring water into the village for agricultural irrigation, while daily water usage comes from the economic center's

water pipes. Additionally, the construction of residences and agricultural environments reflects the relationship between settlements and geological strata. As both settlements are located on ancient geological limestone layers, limestone is an essential building material for homes and fields. Residents use limestone as the foundation stone for homes, the boundary stone for gardens, and the decoration for courtyards, among various infrastructure elements. Geological strata (layer 1: the ground) have become a crucial factor supporting villagers in building their living environment (layer 3: the community).

2.4 Conclusion

Based on the sectional diagram, settlement analysis chart, and organized content from resident interviews, this chapter demonstrated the three initially proposed hypotheses. Altitude is not the sole factor determining whether a settlement is a highland settlement; settlements with significant vertical altitude differences better adhere to the traditional concept of highland settlements regarding settlement structure and residents' lifestyle. Moreover, the presence of vertical altitude differences makes the geographical environment of highland settlements unique, facilitating the cultivation of distinct agricultural products from those grown in lowland settlements. Highland settlements are not physically isolated; they exist at the periphery of the service radius of lowland economic centers, maintaining necessary trade exchanges with them. At this point, transportation becomes crucial in determining whether highland settlements retain their "isolation." The narrow and winding paths that have protected traditional highland settlements for a long time contribute to their sense of seclusion. Essentially, Layer 1 (the ground) provides the foundational elements for shaping the living environment in highland settlements, highlighted by the abundant presence of limestone in this context. Utilizing these elements from Layer 1, highland residents construct their fields and dwellings within settlements (Layer 2: the shape of village). Integrating both layers, the residents ultimately establish internal production and circulation of goods (Layer 3: the community), exemplified by the cultivation of Pione in this case.

While these three hypotheses have been validated through case studies in Japan, Japan is not globally recognized as a highland region. Therefore, employing the same research perspective and methodologies, the study will be replicated within the acknowledged highland world of Tibetan plateau. This repetition aims to authenticate the credibility of the three hypotheses, and the specific details will be presented in the next chapter.

2.5 References

1) 柳田国男. (1998). 柳田国男全集 (Vol. 15). 千歳出版.
Yanagita Kunio. (1998). Complete Works of Yanagita Kunio (Vol. 15). Chitosha Publishing.
2) 柳田国男. (1999). 遠野物語 (Vol. 280). グーテンベルク 21.
Yanagita Kunio. (1999). Tales of Tono (Vol. 280). Gutenberg 21.
3) 宮本常一. (2011). 山に生きる人びと. 河出書房新社.
Miyamoto Tsuneichii. (2011). People Living in the Mountains. Kawade Shobo Shinsha.
4) 柄谷行人. (2014). 遊動論 柳田国男と山人. 文藝春秋.
Katarani Kojin. (2014). Wandering Theory: Yanagita Kunio and the Mountain People. Bungeishunju.
5) 田中啓爾. (1930). 中央日本に於ける高地の人文地誌學的研究概報—本篇は中央日本に於ける人文地誌學的斷面研究概報の後篇であつて, 前篇の平原論, 中篇の山麓論と姉妹篇をなす—. Geographical Review of Japan, 6(8), 1304-1336.
Tanaka Keiji. (1930). Geographical Studies on Highland Cultural Geography in Central Japan—This paper is the second part of a comprehensive report on cultural geography in central Japan, following the first part on plains and the middle part on foothills. Geographical Review of Japan, 6(8), 1304-1336.
6) 井上修次. (1934). 本邦最高地域の居住状態と居住上限界の分布とについて (2) 高地居住調査 (第 1 報). 地理学評論, 10(9), 799-815.
Inoue Shūji. (1934). Living Conditions and Residential Limits in the Highest Regions of Japan (2) Highland Residence Survey (Report 1). Journal of Geography, 10(9), 799-815.
7) 山口源吾. (1974). 高距限界集落: おもに中央日本を例として.
Yamaguchi Gengorou. (1974). High Altitude Boundary Settlements: Primarily Illustrated with Central Japan.
8) 今和次郎. (1922). 日本の民家, 相模書房, 323 頁.
Konwa Jiro(1922). Japanese Folk Houses. Sagami Shobo, 323 pages.
9) 稲垣栄三. (1952). 山村住居の成立根拠-1. 建築史研究/建築史研究会 編, (10), 1-14.
Inagaki Eizo. (1952). Formation Basis of Mountain Village Dwellings - 1. Journal of Architectural History, (10), 1-14.
10) 稲垣栄三. (1953). 山村住居の成立根拠-2. 建築史研究/建築史研究会 編, (12), 20-29.
Inagaki Eizo. (1953). Formation Basis of Mountain Village Dwellings - 2. Journal of Architectural History, (12), 20-29.
11) 稲垣栄三. (1954). 山村住居の成立根拠-3 完. 建築史研究/建築史研究会 編, (15), 11-23.
(1954). Formation Basis of Mountain Village Dwellings - 3 Complete. Journal of Architectural History, (15), 11-23.
12) 樋渡彩.(2019). 近畿大学工学部建築学科都市歴史研究室報告書
Higashiwatari Aya. (2019). Report of the Urban History Laboratory, Faculty of Engineering, Kinki University.
13) 富岡儀八. (1964). 近世の内陸都市と交通路の問題. Geographical Review of Japan, 37(8), 450-468.
Tomioka Gihachi. (1964). Issues of Inland Cities and Transportation Routes in Early Modern Times. Geographical Review of Japan, 37(8), 450-468.
14) 富岡 儀八. (1978). 日本の塩道 : その歴史地理学的研究. 古今書院.
Tomioka Gihachi. (1978). Salt Roads in Japan: A Historical Geographic Study. Kokin Shoin.

15) 宮本常一. (1976). 中国山地民俗採訪録.
Miyamoto Joichi. (1976). Folklore Interviews in the Chinese Mountainous Regions.
16) 野原建一. (2008). たたら製鉄業史の研究. 渓水社.
Nohara Kenichi. (2008). A Study on the History of Tatara Ironmaking. Keisuisya.
17) 渡辺ともみ. (2006)たたら製鉄の近代史. 吉川弘文館.
Watanabe Tomomi. (2006). Modern History of Tatara Ironmaking. Yoshikawa Kobunkan.
18) 角田徳幸.(2019). たたら製鉄の歴史. 吉川弘文館.
Tsunoda Toku. (2019). History of Tatara Ironmaking. Yoshikawa Kobunkan.
19) 雲南市たたらプロジェクト会議. (2022). 雲南のたたら文化.
Unnan City Tatara Project Meeting. (2022). Tatara Culture in Unnan.
20) 赤木祥彦, & 貞方昇. (1988). 高梁川流域の鉄穴流しによる地形改変と水田開発. 人文地理, 40(3), 197-220.
Akagi Yoshihiko, Sadakata Noboru. (1988). Topographic Modification and Paddy Development by Iron Hole Flushing in the Takahashi River Basin. Human Geography, 40(3), 197-220.
21) 貞方昇. (1982). 斐伊川流域における鉄穴流しによる地形改変. 地理学評論, 55(10), 690-706.
Sadakata Noboru. (1982). Topographic Modification by Iron Hole Flushing in the Hii River Basin. Geographical Review, 55(10), 690-706.
22) 高橋一康. (1971). 近世における高梁川の河床変動. 人文地理, 23(6), 596-618. Takahashi Kazuyasu. (1971). Riverbed Changes in the Takahashi River in Early Modern Times. Human Geography, 23(6), 596-618.

Chapter 3. 本論・ The research of traditional Highland villages in China

Chapter 3　本論・The research of traditional Highland villages in China

3.1 Introduction

In the research of highland settlements in Japan, the study method of cross-sectional diagrams indicates that settlements without an absolute high altitude exhibit patterns of highland settlements in terms of village structure and material exchange with lowland areas due to variations in vertical elevation difference. Additionally, settlements at absolute high altitudes are disrupted from the elevated “isolation” form due to convenient transportation systems, resulting in the adoption of operational patterns similar to those of non-highland settlements. Therefore, this chapter will carry out confirmatory research in recognized highland regions based on the conclusions drawn in Chapter 2. The study area selected for this chapter is Shangri-La, Diqing Tibetan Autonomous Prefecture, located in the southern region of the Tibetan Plateau. The reasons for selecting this research area can be summarized as three factors: elevation, watershed, and multi-ethnic culture.

3.1.1 Elevation: the 1st gradient terrain of China [1)]

A conceptual diagram that delineates the scope of the world's four major highland regions is presented in the introductory chapter of this report. Among these, the Tibetan Plateau, renowned for hosting the world’s highest peak, the Himalayas, is often considered the premier highland region. Regarding administrative divisions, the entire Tibetan Plateau falls within the territorial boundaries of China. Based on differences in elevation, China’s landmass is categorized into three tiers from west to east:

- The Tibetan Plateau constitutes the first tier, with an average elevation over 4000 meters.
- The central mountainous region represents the second tier with an average elevation of 2000 meters.
- The coastal areas form the third tier with an average elevation below 2000 meters.

The Diqing Tibetan Autonomous Prefecture spans the southernmost part of the Tibetan Plateau and serves as the plateau’s transitional zone, as shown in the following figure.

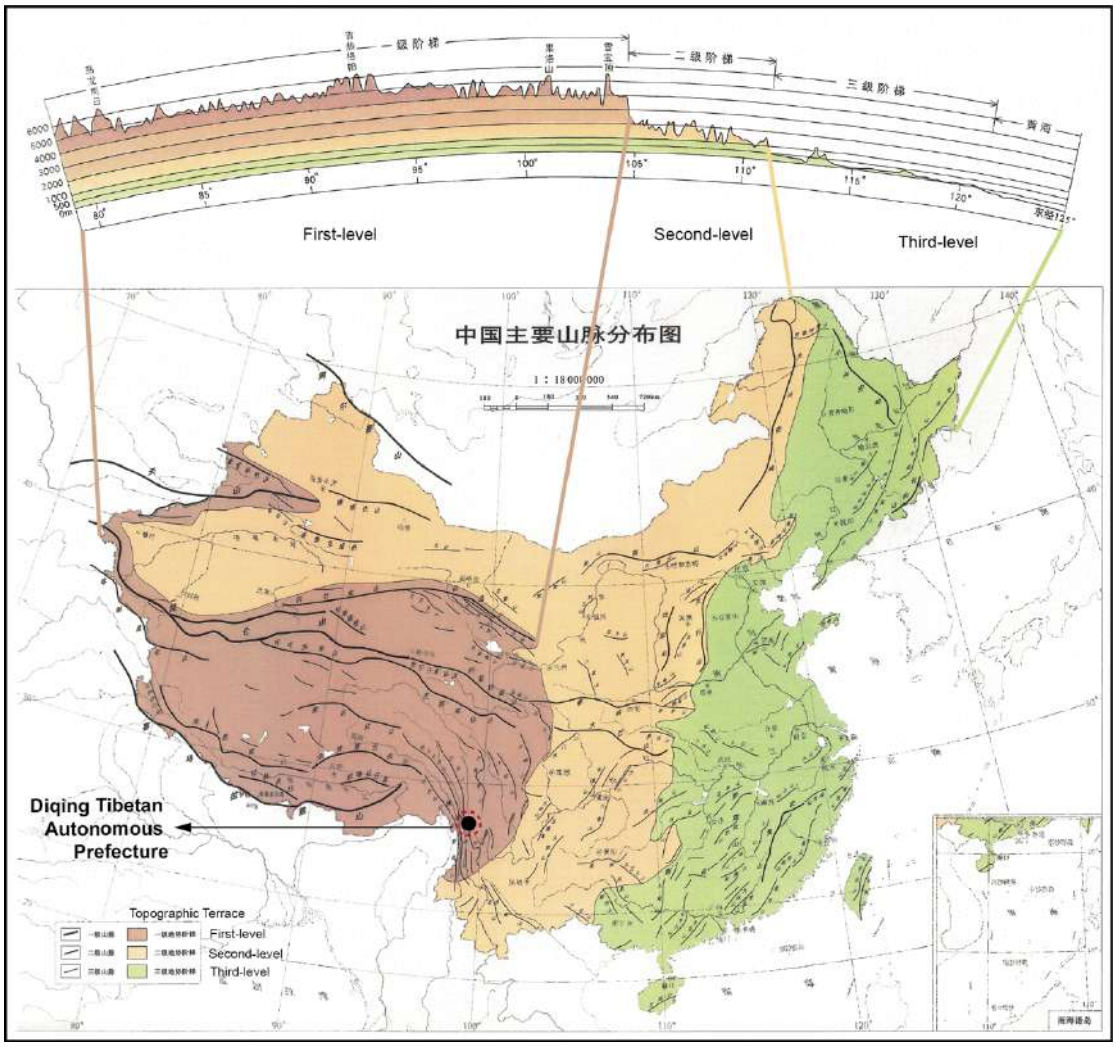


Figure 3- 1. The topographic elevation terraces of China[41]

3.1.2 Watershed: Three parallel rivers [2)]

In the geological evolution of the Tibetan Plateau, mountain ranges and faults have played a key role, leading to the uplift and elevation of the Earth's crust and forming a geological foundation for rivers. Consequently, many rivers originate on the Tibetan Plateau, including the Yangtze and the Mekong. The Three Parallel Rivers World Heritage Site is situated at the southern tip of the Tibetan Plateau, where the Nu River ((Salween River), Lancang River (Mekong River), and Jinsha River (Yarlung Tsangpo River) converge, forming an extraordinary geographical landscape. Combining these three rivers has shaped a distinctive natural landscape of highland gorges. Among them, the Jinsha River and Lancang River flow through the territory of Diqing Prefecture, highlighting the region's unique high mountain and gorge landscape features.

[41] Cited from Reference "Ma Lifang. (2002). Geological atlas of China. Beijing, Geology Press.," p.13 & p.16. Reedited by the author.

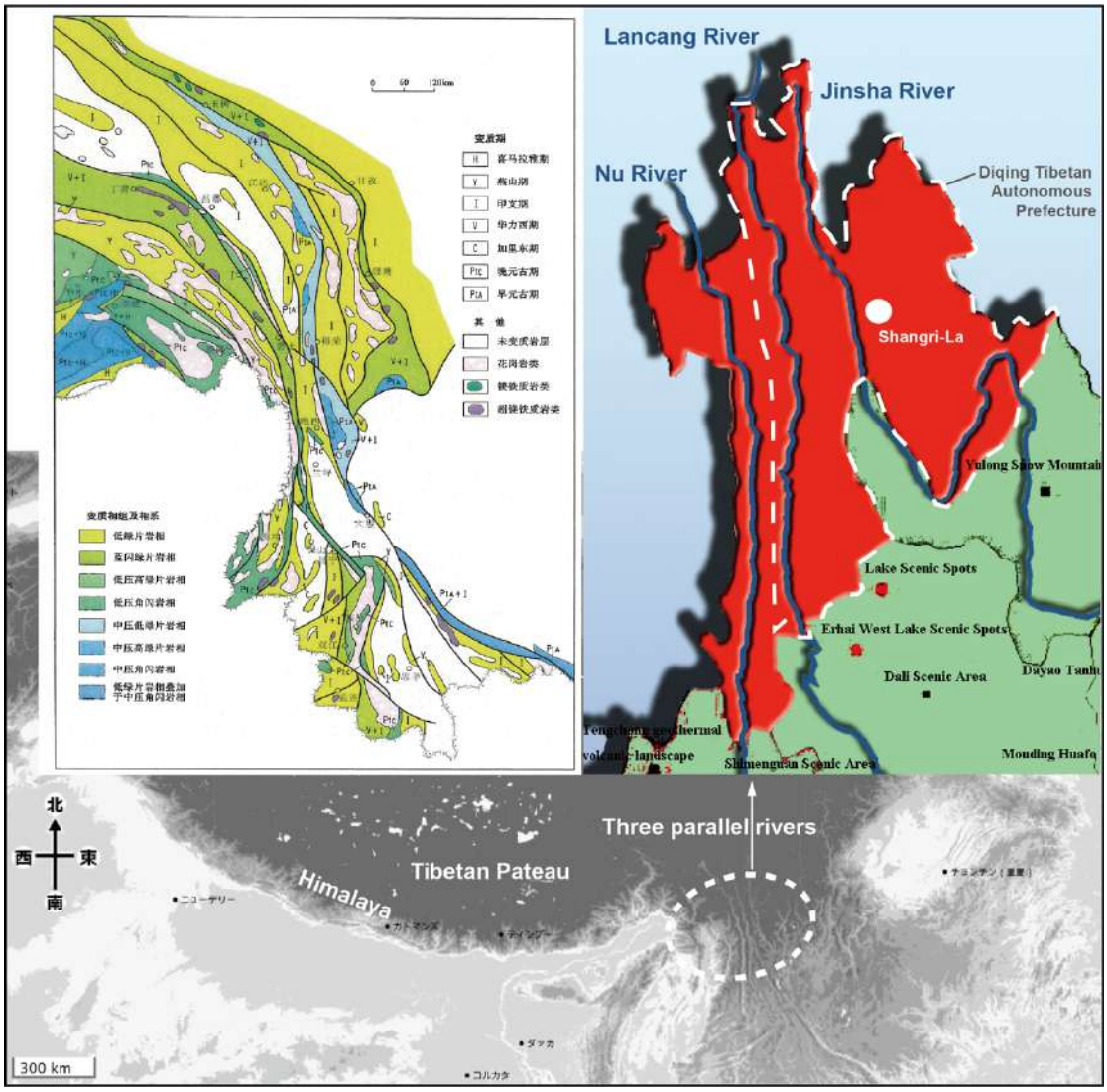


Figure 3- 2. Geological Map of the three parallel rivers[42]

3.1.3 Multi-ethnic culture: Tea-Horse Road

Tibetan cultural region is generally divided into three parts: the Ü-Tsang region, the Amdo region, and the Kham region. Diqing Tibetan Autonomous Prefecture belongs to the Kham region and is situated southeast of the Tibetan cultural area. As a junction area of Tibet, Sichuan, and Yunnan provinces, Diqing has always been at the edge of Tibetan development territory in history and has been viewed as the border of the ancient Tubo Dynasty. Diqing is a unique multi-ethnic Tibetan district home to 26 registered ethnic minority populations, around one-sixth of Chinese minority groups. As the outermost region of Tibetan culture, Diqing Tibetan Autonomous Prefecture has historically served as a transitional zone for cultural exchanges between the Tibetan ethnic group and other minority groups [3)]. As a significant exchange hub, Shangri-La, the capital of Diqing, played a pivotal role in transporting tea from the lowlands to the highlands during the period of the

[42] The base map is sourced from the Geospatial Information Authority of Japan. The top-left geological map is Referenced from "Ma Lifang. (2002). Geological atlas of China. Beijing, Geology Press.," p. 107. The top-right location schematic is sourced from "Li Hui. (2010). Ecosystem Risk Assessment and Spatial Differentiation of Ecological Security in the 'Three Parallel Rivers' World Natural Heritage Site. National Natural Science Foundation of China (Grant Number: 50968017).

Tea-Horse Ancient Road. Shangri-La is home to various minority groups, such as Tibetans (32%), ethnic Lisu (27%), and ethnic Naxi (12.6%), among others [4]. It is one of China's representative regions where diverse ethnic groups, with Tibetans as the predominant group, coexist, reflecting a rich multi-ethnic culture. As a trading hub that has developed into a region of multicultural integration, Shangri-La's uniqueness contributes significantly to the study perspective of "Highland and Lowland Interaction".

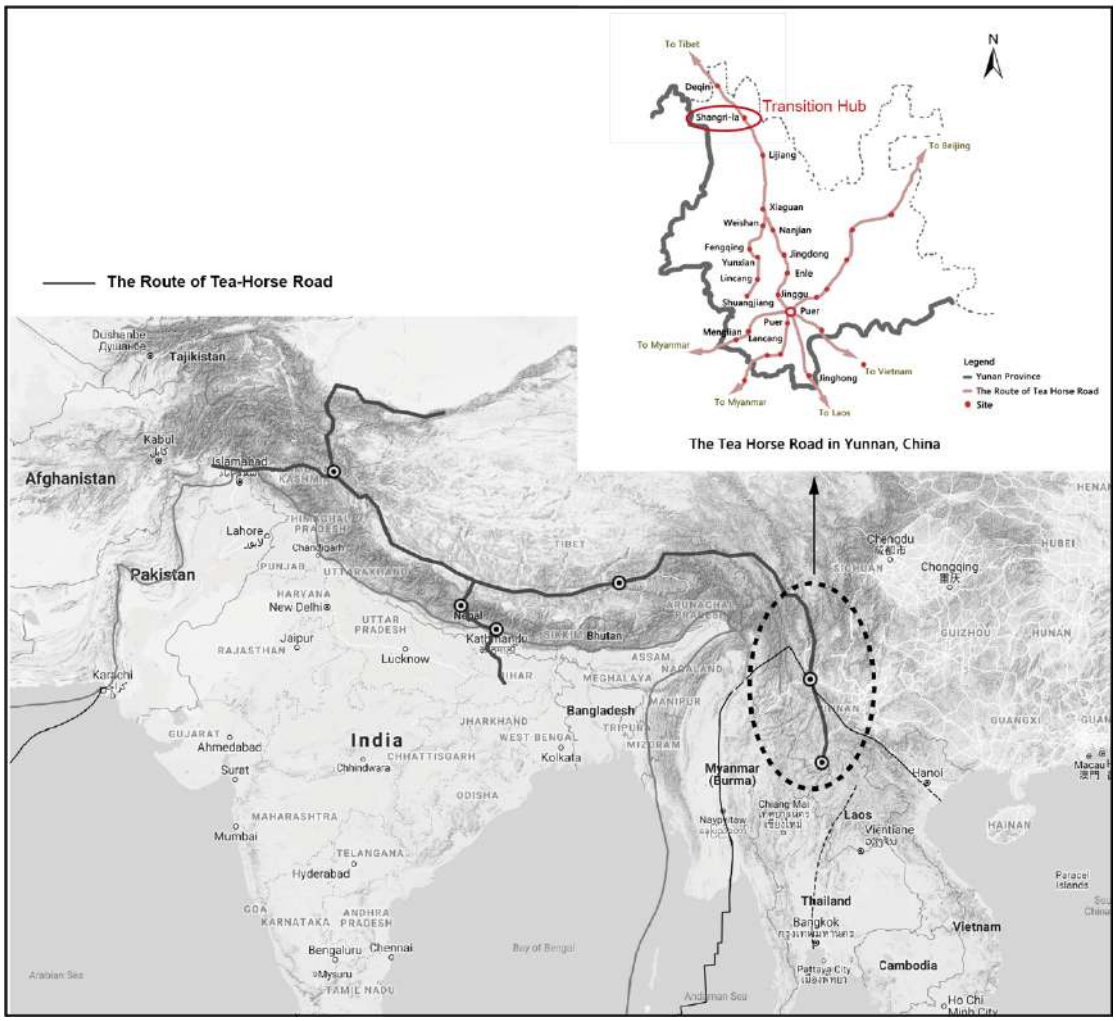


Figure 3- 3. The diagram of Tea-Horse road in Yunnan Province[43]

Therefore, considering the three factors mentioned above, this chapter's validation study was ultimately conducted within the territory of Diqing Tibetan Autonomous Prefecture, specifically, Shangri-La region.

3.2 Literature Review

The majority of research conducted in the Shangri-La region has been focused on Tibetology for an extended period of time. Chinese-language research has steadily increased in recent years on ethnic culture and traditional architecture. Foreign scholars' research has primarily taken the form of travelogues, mainly due to the limitation of field research. However, in terms of research breadth, depth, and content, it still falls far short of capturing this region's unique and enchanting aspects.

[43] The base map is sourced from the Geospatial Information Authority of Japan. The route of Tea-Horse Road drawn by author.

Additionally, no previous research has been conducted on highland settlements in this region. In view of the lack of research literature, this section focuses primarily on analyzing local chronicles and summarizing relevant domestic and international publications.

3.4.1 Examining Place Name Changes in Local Histories: Rgyalthang--Zhongdian--Shangri-La [3), 4), 5), 6), 7), 8), 9)]

As a critical element in unlocking a region's history, place names are indispensable in urban history. The history of the Shangri-La region is lengthy, from its origins as Tibetan grazing land to later becoming a contested strategic pass under various regimes. Over more than 1300 years, the region has undergone shifts in governance and occupation, leading to continuous changes in its place names. However, the extensive history and incomplete geographical name research have made place names' semantics and evolutionary processes unclear. Therefore, this section first collects existing local chronicles to compile information on urban development and toponymic changes in Shangri-La, as presented in the table and figure below.

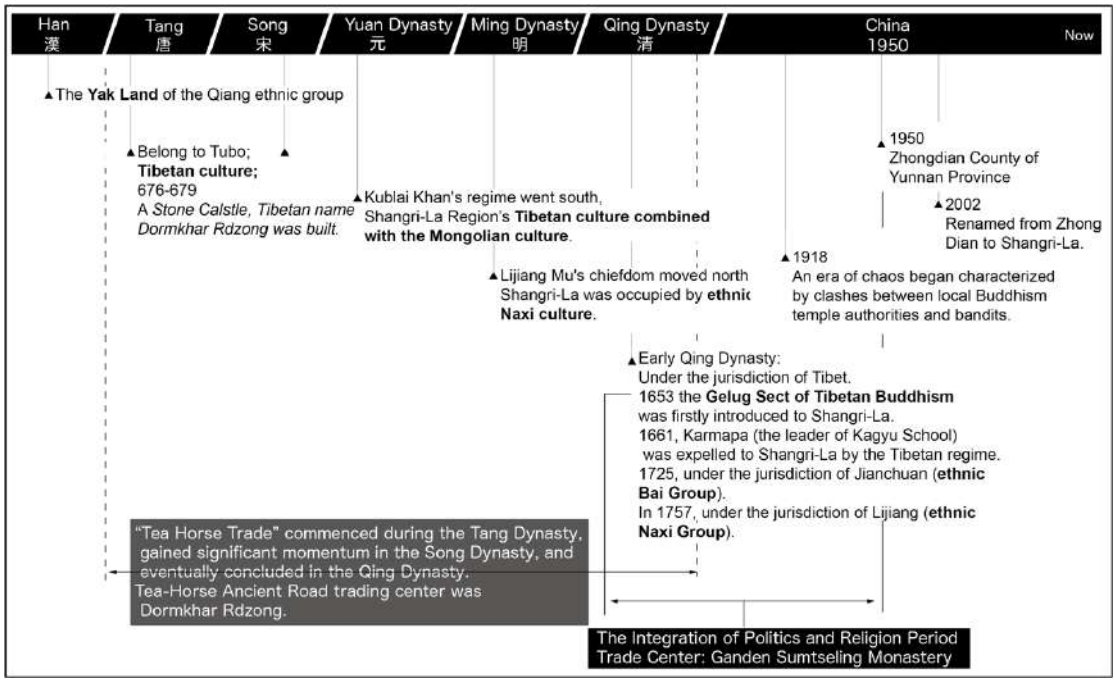


Figure 3- 4. Chronological diagram of Place Name changes in Shangri-La[44]

Table 3- 1. Table of Shangri-La Place Name Translations at Different Periods[45]

Era	Place Name	Meaning	Language
Tang Dynasty	Rgyalthang	Incomparably auspicious place.	Tibetan, རྒྱལ་ཐང་, transliterated as "Qie Dang 且当" in Chinese.
Song Dynasty			
Yuan Dynasty	Dan Dang		Chinese, mistakenly wrote "Dan Dang (旦当)" instead of "Qie Dang (且当)".
Ming Dynasty	Ndzi dy	Precious land inhabited by a chieftain surrounded by mountains.	Naxi language, transliterated as "Zhong Dian 中甸," initially written as "Zhong Dian 忠甸," later changed to "中甸" in Chinese.

[44] Drawn by author according to References 3)-9). Consulted the References list of this chapter for further details.
[45] Concluded by author based on the management of References 3)-9). Consulted the References list of this chapter for further details.

Qing Dynasty	Zhong Dian	-	Continuation of the Chinese name "Zhong Dian 中甸" from the Ming Dynasty.
1957	Zhongdian County, Diqing Tibetan Autonomous Prefecture	A land full of peace and harmony.	Diqing, Tibetan, བདེ་ཆེན།. Transliteration from Tibetan to Chinese.
2002 (Renamed)	Shangri-La County	The moon and sun in people's heart.	English, from Jame Hilton's novel.

The reasons for the variations in place names from the original Tibetan name "Rgyalthang" to the later "Zhongdian" are primarily due to the predominant ethnic cultures in different time periods and discrepancies that arose during the transliteration of minority ethnic languages into Chinese. Although these place names differ in language, they all convey the essence of being a "precious land in Tibetan plateau." It is worth noting that the name "Shangri-La" is derived from the book "Lost Horizon" by British author James Hilton, a story in which a pilot crashes and stumbles into a utopian village in the Tibetan region. Based on the utopian's rough geographical location in the novel, the meanings of Tibetan place names in Diqing and Rgyalthang, as well as various natural and cultural elements, Zhongdian County was renamed in 2002 to Shangri-La County. Throughout the development history of the Shangri-La region, the influence of multiple ethnic cultures has always been a prominent feature, which is aligned with its status as the southernmost part of the Tibetan Plateau and the periphery of Tibetan culture. The cultures of various minority groups, including Tibetans and Naxi, have played varying roles in its history. Cultural integration in different historical periods results from mobility and exchange between villages and populations. Consequently, there must be robust economic, culture, and material exchanges between the highland and lowland settlements in the Shangri-La region.

3.4.2 Examining the Model of Exchange Between Uplands and Lowlands Centered Around Tibetan Buddhist Monasteries [10, 11)]

During the Ancient Tea Horse Road era, trade exchanges in the Shangri-La region were primarily conducted within the city center of Dormkhar Rdzong. However, the Ancient Tea Horse Road gradually declined in the Qing Dynasty. In 1653, the Gelug sect of Tibetan Buddhism was introduced into the Zhongdian region, which started a new fusion of politics and religion. This fusion of politics and religion, known as theocracy, meant that the largest Tibetan Buddhist monastery in Shangri-La, the Gedan Songzanlin Monastery (formerly known as Guihua Monastery), not only served as a religious institution but also held administrative functions. For a considerable period, it governed the entire Shangri-La region east of the Jinsha River.

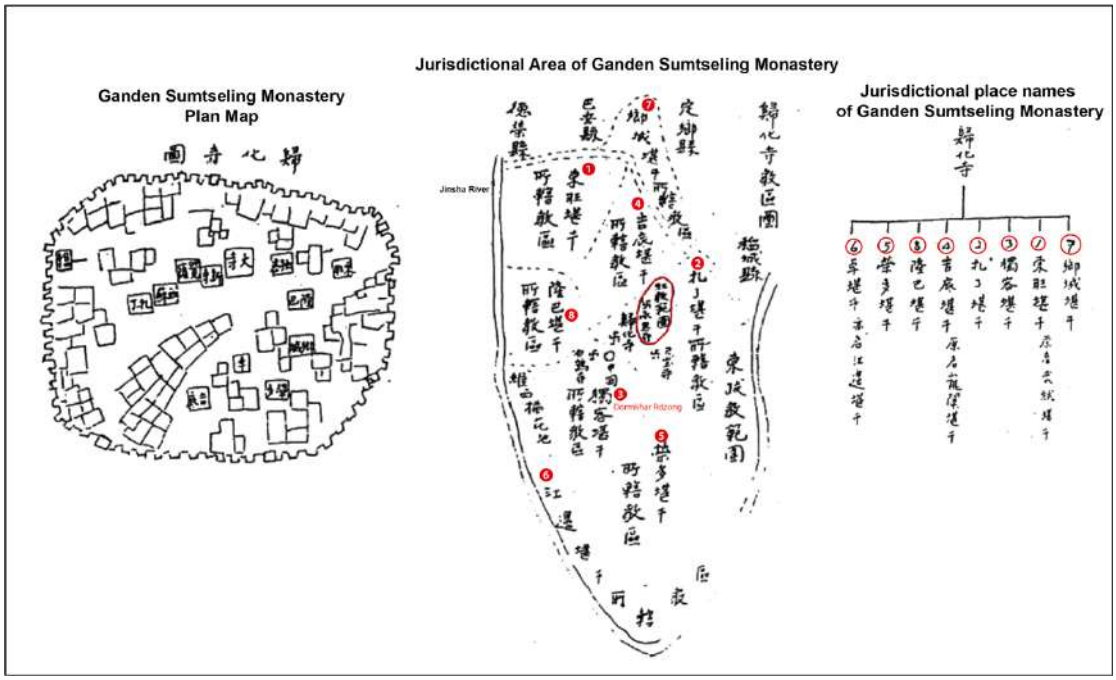


Figure 3- 5. Illustrative diagram of Ganden Sumtseling Monastery and its Jurisdictional Area Before 1950[46]

During the era of this amalgamation, the monastery encompassed economic, political, and religious roles, collecting rents from the surrounding villages and hosting trade markets. A distinct urban pattern emerged during the monastery's administration, where the temple interacted directly with surrounding villages, becoming a vital center facilitating cultural, economic, and material exchanges. By 1950, Ganden Sumtseling Monastery's administrative functions had ceased, leaving it to serve solely as a Buddhist temple for villagers to pray during festivals, gradually evolving into today's focal point of cultural and spiritual activity.

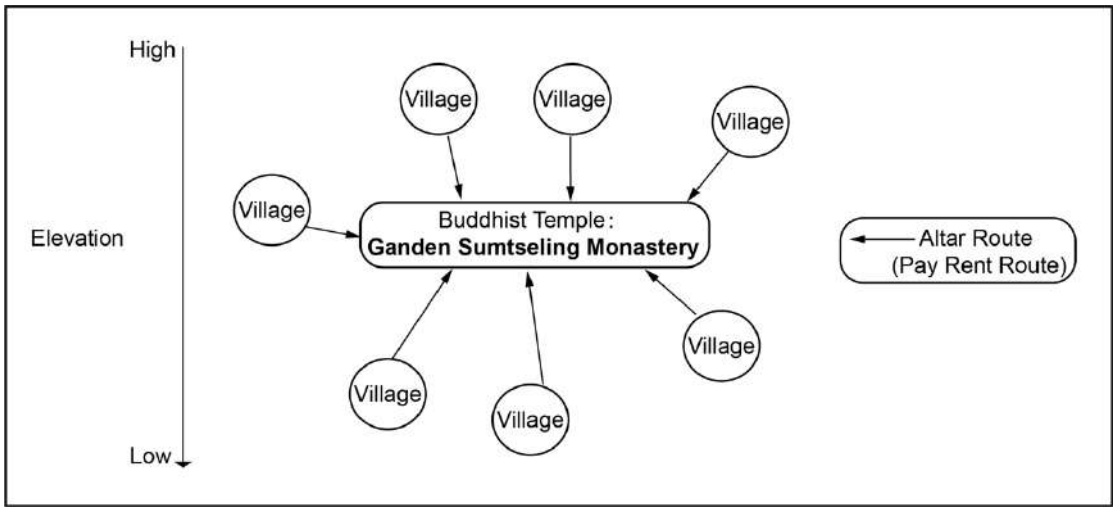


Figure 3- 6. Cultural Exchange Network of Ganden Sumtsuling Monastery and surrounding villages in the past[47]

[46] Cited from Reference "Comprehensive Local Chronicles of China. (2009). Yunnan Prefecture and County Chronicles Compilation. Phoenix Publishing House.," p.37 &40, edited by author.
[47] Drawn by author.

Currently, academic research in the Shangri-La region exhibits two main trends.

- One trend focuses on broad, cross-regional, and cross-ethnic studies with an emphasis on the Hengduan Mountains, or northwestern Yunnan.

Japanese ethnologists such as Tanihata Hisao and Kanamaru Yoshiko have conducted field research in China since 2005, focusing primarily on ethnic industries in the Hengduan Mountain Area[12]. For instance, they have researched the industrial composition of Nixi Village, a Tibetan settlement famous for its wooden bowl production in Shangri-La, through interviews with skilled artisans involved in wooden bowl making. They have also studied the livestock industry in Niru Village (a Tibetan settlement famous for its livestock), explaining that the livestock income is mainly derived from dairy and woolen products[13), 14)]. Since the study focuses primarily on the production and livelihoods of minority ethnic groups in the Hengduan Mountains, it ultimately consists of a comparative analysis of industries within various villages across various provinces and ethnicities (Naxi, Lisu, Bai, Tibetan, and others). Furthermore, broad-spectrum studies of ethnic architecture are often conducted in the Hengduan Mountains region. Jiang Gaochen, for instance, begins his research on the architectural culture of the Hengduan Mountains. Jiang conducts surveys of residential styles, mapping out Tibetan traditional earthen houses in Shangri-La and Deqin. Subsequently, he conducts comparative analyses with the dwellings of other ethnic minorities in Yunnan[15)].

- In addition, there is another category of research that focuses on specific types of buildings or specific types of villages in Shangri-La.

As one of the representatives of Tibetan dwelling research in Diqing, Zhai Hui has conducted surveys of different types of Tibetan dwellings in the Shangri-La region. He categorizes high-altitude Tibetan dwellings based on roof forms into “shingle tile” types and “flat-roofed fortress” types for valley areas[16)]. Tanouchi Mariko has focused more on studying individual Tibetan dwellings. By examining the internal spatial distribution within Tibetan dwellings in Shangri-La, Tanouchi has summarized the spatial distribution pattern in Tibetan dwellings, which follows a sequence from bottom to top, with livestock, people, and Buddha[17)]. Furthermore, research on settlement layouts and spatial distribution in different villages has steadily increased in recent years.

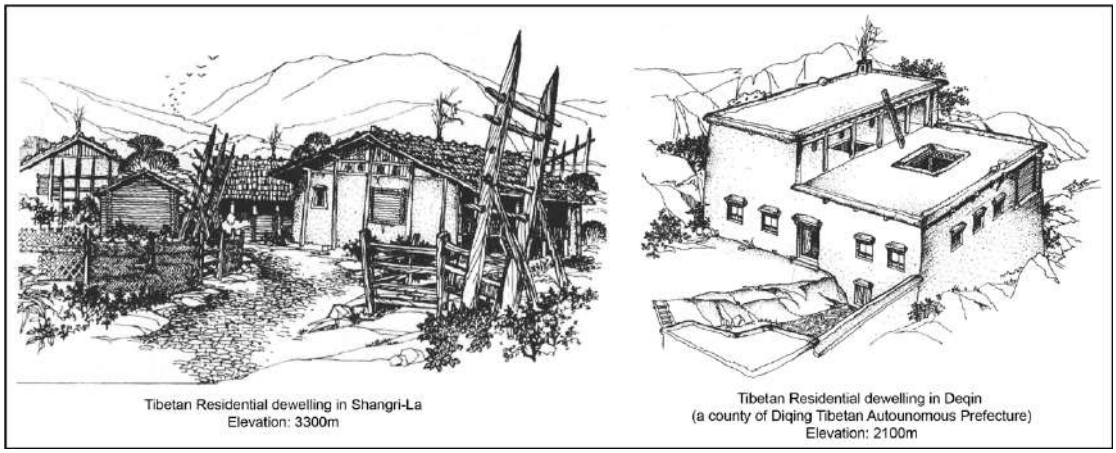


Figure 3- 7. Shangri-La’s Tibetan residential houses in High-altitude and Low-altitude regions[48]

[48] Cited from Reference “Jiang, C. 1997. Yunnan ethnic housing culture. Yunnan, Kunming: Yunnan University Press.,” p. 347 & 361.

From the current academic findings, research has primarily concentrated on either super-regional studies encompassing the Hengduan Mountains or individual studies focused on specific settlements or buildings. There has yet to be research that delves into the diversity of ethnic cultures and the natural geography in the Shangri-La region itself. Specifically, there hasn't been research into the interconnectivity between highland settlements and lowland settlements in the Shangri-La region. Consequently, following the methodology established in the Japanese study, settlements were selected for a comprehensive study based on the lack of comprehensive settlement research in the Shangri-La region.

3.3 Research Objects in China

In the research conducted in Japan, a transversal study was completed along the rivers from the Seto Inland Sea to the Nippon Sea by spanning across the geographical central structural line. Although the Shangri-La region's mountainous terrain lacks a central dividing line, it is traversed by two enormous snow mountain ranges extending north to south across the entire area. By traversing the snow mountain ranges along the river, a comparative study of different types of settlements can be constructed from high to low altitudes. Additionally, the highest snow peak within the Shangri-La region, the Barla Ger Rdzong (Balagezong in Chinese pronunciation) main peak at 5,545 meters, is located on the eastern side of the Jinsha River. Therefore, in this section, the main focus is selecting the crossing of the Barla Ger Rdzong snow mountain range as the primary research subject for studying highland settlements in the Shangri-La region.

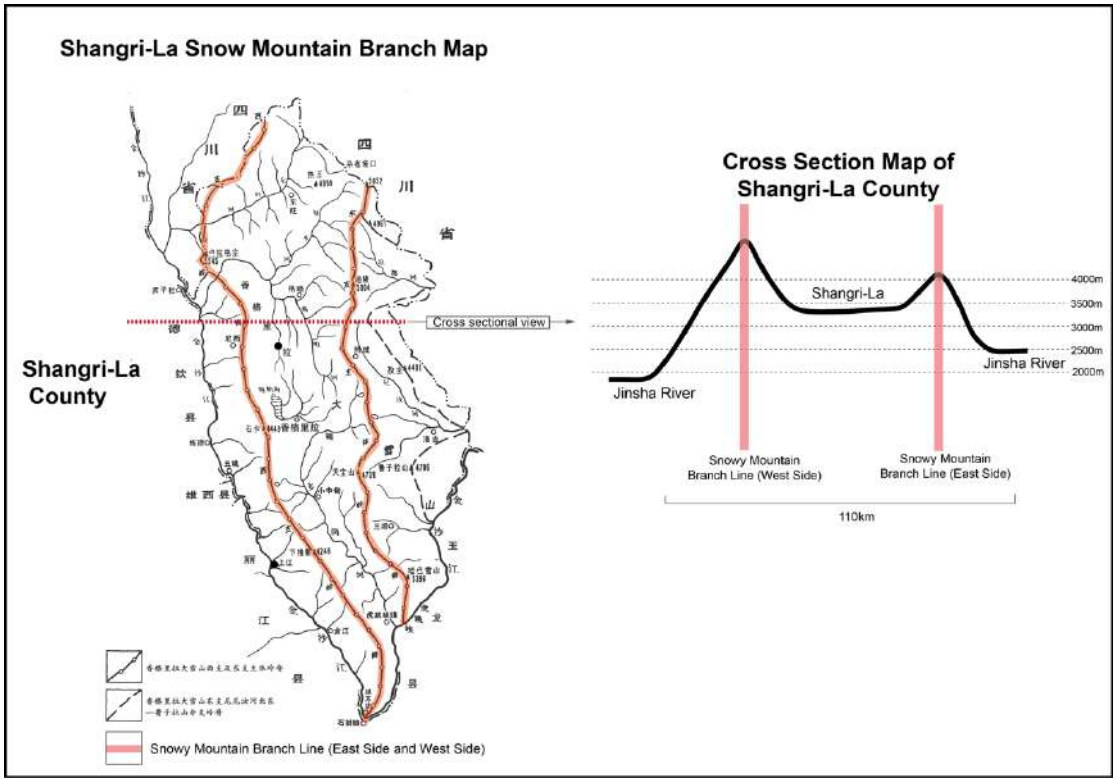


Figure 3- 8. The Map of Snow Mountain Branch of Shangri-La (Left side)[49]

Figure 3- 9. The Cross Section Map of Shangri-La (Right side)[50]

[49] The base map is cited from Reference "People's Government of Shangri-La County (2015). Shangri-La County Annals.," p. 14.
[50] Drawn by author.

Previous Japanese studies have pointed to the unique features of highland settlements through the analysis of river section maps. These features include the vertical drop distance from the river and the marginal economic exchange distance. In the field research of Shangri-La, more attention will be paid to the discussion and demonstration of the two characteristics of the Japanese highlands. Furthermore, the unique multiethnic cultures of the Shangri-La region include crossing through diverse ethnic populations from high to low altitudes.

Therefore, the transversal of the Shangri-La section encompasses two aspects: geographical transversal and the transversal of ethnic-cultural regions. Geographical cross section, which is along a river from high altitude to low altitude villages. The cross section of ethnic culture, which entails traversing multi-ethnic cultures from the Tibetan residential area to the mixed residential areas of other ethnic minorities and finally arriving at the Han residential area to examine the living hood of the highland area. The concept of cross-sectional studies in Shangri-La regions can be summarized as Figure 3-10. As a result of combining the cross-sectional view and the specific direction of the Shangri-La River, the research route has been determined as Figure 3-11.

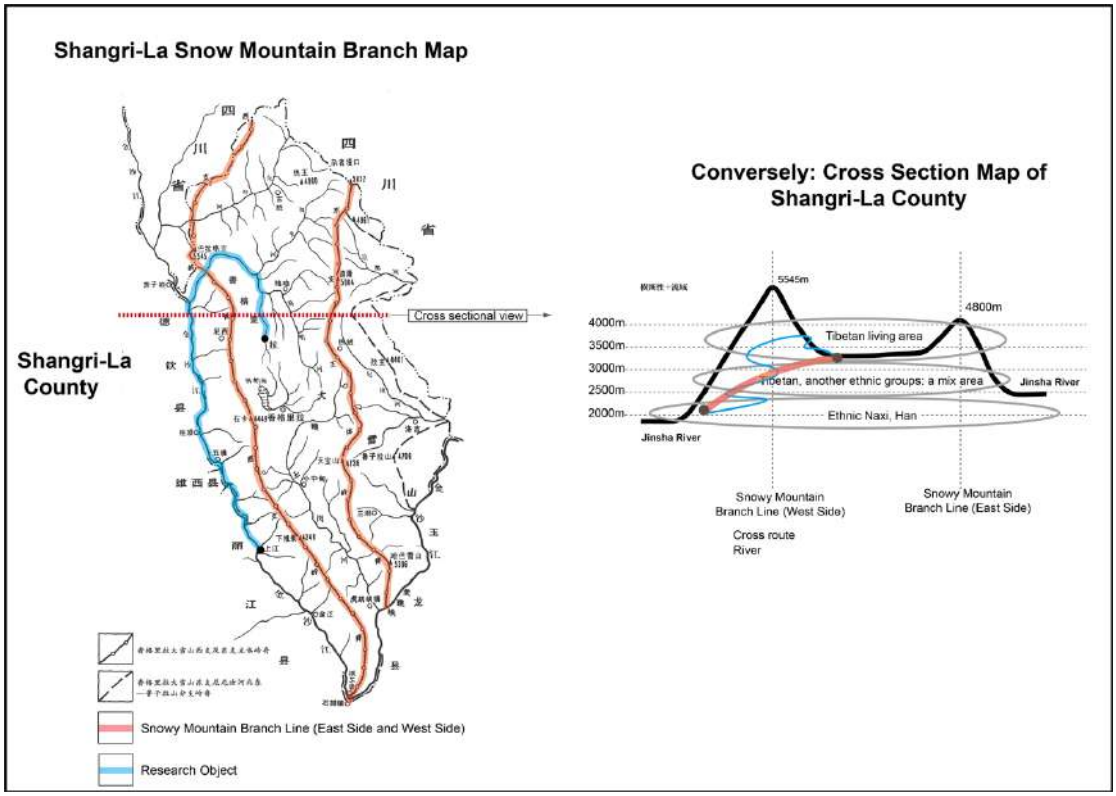


Figure 3- 10. Stereographic representation of transverse viewpoints (Left side)[51]

Figure 3- 11. Diagram of research route (Right side) [52]

The research route begins with Tibetan settlements in the high alpine basin and ends with Han villages in the lower impact plain. Additionally, the route flows into the Jinsha River after passing through the Bara Ger Rdzong snow mountain group. To ensure comparability between this chapter and the Japanese study, the selected research villages in the Shangri-La region adhere to the

[51] Drawn by the author.
[52] The base map is sourced from Reference "People's Government of Shangri-La County (2015). Shangri-La County Annals.", p.14.

following principles:

- Elevation, both absolute elevation and relative elevation.
- Settlement characteristics: either agricultural production areas or economically exchange-oriented locations.

Finally, based on the review of local records and other essential information, 12 settlements were chosen as research subjects, as detailed in the table below.

Table 3- 2. Summary table of research objects[53]

No.	Name of villages	Elevation (m)	Ethnic Group	Characters of village
1	Dormkhar Ancient Town （独克宗古城）	3300	Tibetan, Han, ethnic Hui, ethnic Naxi etc.	High-altitude city, the old city center and the place of economic exchange.
2	Jidi (吉迪)	3200	Tibetan	Agricultural village, abundant production of Highland Barley (Qingke)
3	Langshi (朗史)	3500	Tibetan	Livestock-based settlement, primarily raising yaks.
4	Mulu (木鲁)	2600	Tibetan	Agricultural village, abundant production of rice.
5	Qutu (曲土)	2700	Tibetan, ethnic Nashi	Agricultural village, abundant production of rice.
6	Nagela (那格拉)	3700	Tibetan	Agricultural village, abundant production of highland potatoes.
7	Cangjue (仓觉)	2000	Tibetan	Economic center。
8	Khamsegan (科色各)	2700	Tibetan	Agricultural village, abundant production of Highland Barley.
9	Chundu (春独)	1900	Tibetan with ethnic Lisu	Economic Center
10	Fuku(福库)	1900	Ethnic Nashi and Han	Economic Center
11	Hongtu (红土)	2300	Ethnic Lisu	Agricultural village, abundant production of medicine metrials.
12	Shiwang (仕旺)	1800	Han	Agricultural village, abundant production of rice and vegetables.

As a result, a one-month on-site research was conducted in Shangri-La in February 2023.As shown in the figure 3-12[54].

[53] Concluded by the author.
[54] Drawn by the author.

Figure 3- 12. The on-site research in Shangri-La conducted in 2023

3.4 Research Results

Similarly, this section completed the table of settlement information (Figure 3-13 [55]) and the 3D cross-sectional diagram of settlements (Figure 3-14 [56]) based on the same research methodology.

[55] Figure 3-13 was summarized by the author according to field research results.
[56] Figure 3-14 was drawn by the author. The Geological information refer to Reference "云南省区域地质志 / 云南省地质矿产局. (1990). 地質出版社."

シャングリラ山地流域調査基礎情報チェックシート			1	2	3	4	5	6	7	8	9	10	11	12
集落基本情報	集落名		Shangri-La City	Jidi (吉迪)	Langshi (朗史)	Mulu (木鲁)	Qutu (曲土)	Nagela (那格拉)	Cangjue (仓觉)	Khamsergan (康色冈)	Chundu (春独)	Fuku(福库)	Hongtu (红土)	Shiwang (仕旺)
	流域		A tributary of the Jinsha River							Jinsha River				
	初出年代区分		唐代	唐代	唐代	唐代	唐代	唐代	唐代	唐代	唐代	唐代	民国時代から	唐代
	面積（km2）		16.6	33.3	22	23	12	66.67	65	60	25.33	16.87	51.02	35.67
	人口（地方志により最新データ）		700戸3100人	30戸185人	32戸180人	45戸181人	10戸55人	47戸241人	38户143人	30戸129人	73户288人	56户179人	48戸202人	70户277人
	民族		チベット族、漢，回族など	チベット族	チベット族	チベット族	チベットとナシ族	チベット族	チベット族	チベット族	チベット族	ナシ族	リス族	漢族
調査村民小組			**Dormhkar Rdzong（独克宗）**	**Yisi（益司）**	**Langshi（朗史）**	**Amu（阿姆）**	**Qutu（曲土）**	**Zuoli（左里）**	**Cangjue（仓觉）**	**Khamsegan（康色冈）**	**Chundu（春独）**	**Gelan Erzu(格蘭二組)**	**Hongtu（红土）**	**Machang Yizu（馬場一組）**
層１（大地）	立地(集落概要)		山間盆地に位置する	山間盆地に位置する	金沙江支流の山間斜面地に位置する	金沙江支流の山間台地に位置する	金沙江支流の山間斜面地に位置する	金沙江支流の山間斜面地に位置する	金沙江流域の河川平坦地に位置する	金沙江沿岸の山間台地に位置する	金沙江流域の河川平坦地に位置する	金沙江流域の台地に位置する	山脊の斜面に位置する	金沙江流域の河川平坦地に位置する
	標高	国土地理院から判断	3300m	3200m	3700m	2600m	2700m	3700m	2000m	2700m	1900m	1900m	2300m	1800m
	地質		断面図参照：古生代に位置する	断面図参照：古生代に位置する	断面図参照	断面図参照	断面図参照	断面図参照：花崗岩帯に分布しいる	断面図参照	断面図参照	断面図参照	断面図参照	断面図参照	断面図参照
	災害（ヒアリングによる）	地名辞典・ヒアリングなどから	2014年に火事が発生し、230以上の伝統的なチベット族の住居が焼失した	なし	2009年と2010年に地震が発生し、いくつかの民家が崩壊した。約100年前に、天然痘のような疾病が発生し村民が病気で亡くなり、避難して、村が無人村となった。現在の村は、その当時に7つの家族が無人村に戻って建て直したものである	なし	なし	土砂災害警戒区域	河川氾濫、洪水 2018年の堰塞湖洪水	なし	河川氾濫、洪水 2018年の堰塞湖洪水	河川氾濫、洪水 2019年の堰塞湖洪水	なし	河川氾濫、洪水 2008年、2018年に2回の大規模な洪水が発生した。現在の村は2018年の災害の後に再建された
層２（集落のかたち）	村民小組の要素（現地調査による）		シャングリラの初期の形態であり、元々は円形の城塞状態をしていた。宗Rdzongはチベット語で、石の城塞を意味する。かつては茶馬古道の交易拠点であったが、観光化が進んだ後、住民のほとんどがRdzongの中心地から移転した	Jidiはチベット語で平和と祥和の意味であった。かつてはGedan Songzanlin Monasteryの支配地域であった。現在は松茸産業でシャングリラで有名である	Langshiはチベット語で、風の源を意味する。この集落は雪山の麓の山脊に位置し、周囲に山や木々などの遮蔽物がないため、風が非常に強い。1988年に最初の交通が完成した。政府と宗教が一体となっている段階で、村民は松赞林寺に賃費を支払うために山を越えて3日間歩かなければならないか、物資と交換しなければならなかった	Muluはナシ語で、「牦牛を放牧する場所」を意味する。最初はナシ族の居住地であり、現在の神山はナシ族の時代から残された神山文化を継承する。現在、村内はチベット族の居住地である	「チベット語で発音すると「Chetu（チェツ）」で、中国語では「Chitu（チトゥ）」または「Qutu（クトゥ）」と表記された。地名の意味は「床のように一般的な広さの場所」であったが、非常に狭い場所と形容しった。周囲の村落の中で、最も長い歴史を持つチベット族の居住地であり、歴史的には土司の寨の遺跡が存在し、村の東側に位置していた	Nagelaはチベット語で、「森林の場所」を意味する。村民により、Langshiは風の源であり、そこからの風がNagelaに向かって吹くことになったと言った。2002年になって初めて公道が整備され、それ以前は人々が馬に物を運ぶ交通手段であった	近隣の集落の小さな貿易集市地である。主要な住民はチベット族であるが、民家の様式は下流の漢族やナシ族の様式と基本的に似ている	村落名はチベット語で「高山牧場」を意味する。村民は伝統的なチベット族の宗教である「ボン教」を信仰し、神山信仰もあった	三つの行政区の交差点に位置し、古代からチベットの領土とナシ族の領土の境界地であった。かつてのチベットの鉄橋は村の北部に建てられた。ナシ族、漢族、チベット族の文化が交差する地で、村の中にあるチベット族の住居は完全にナシ族の住居の中庭の建築スタイルを示す	全称は格蘭湾である。漢語の地名で、金沙江の川が曲がる形状に基づいて名付けられた	红土は漢語で、当村が赤土で覆われていることに由来する。村の東側の山地は、昔からもバイモや他の薬草などが豊富に産出していた	金沙江の東側に位置する。士旺はナシ族の地名で、才能ある人々が多く出ることを願って名付けられた。馬場は、漢語の地名で、この地域は歴史的に人がまばらで、牛や馬を放牧する場所であった。1960年代以降、馬場に農家が増加し、2つの生産グループに分かれた
	集落平面の特徴		Rdzongの円形構造と城壁の遺跡は、時間の経過とともに徐々に消えていき、現在の都市の形状は大仏寺を中心に、住宅が周囲に広がっている	聚落は両側に山に囲まれ、山間の平地に位置する。民家は田畑の間に分散しており、聚落全体が散村の状態を呈する	強風のため、すべての家屋は密集しており、農地は下に広がっています。交通は閉塞状態で、Jidi方向への唯一の道路がある	雪山の山脚に位置し、四方を山に囲まれた、全体的に渓谷地帯の気候特徴を持っている	山の斜面に位置し、村全体の面積は比較的小さく、耕地は段々畑の状態。	村全体が赤い岩層の上に位置して、田地は急傾斜で土地は肥沃でない。気候は比較的寒冷である	金沙江の沿岸に位置し、川の谷間の平坦な地域にあり、気温は高い	金沙江沿岸の山間台地に位置し、交通が不便。Cangjue村から出発し、山岳道路を約40分かけて到達する必要	金沙江の沿岸に位置し、川の谷間の平坦な地域にあり、気温は高い	格蘭街を中心に、住宅が通り沿いに広がっている。農地は山と川の両側に広がっている	斜面地に位置し、住宅は田畑の間に散在する	住居は集落なかにこある水路の近くに集中する。金沙江から山までの配置は、水、田、住居、田、山の順である
	神社・寺・集会所・城館の状況	集落平面図に記載する	大仏寺、四方街、月光広場	Jidi Buhhda's Temple	村の入り口にチベット仏塔があり、村の中にはラカン（拉康）があった。	一つの チベットラカンがあり、Chituと共有	Amuのラカンと共有	チベットラカンなし 仏塔あり	チベットラカンなし 仏塔あり	神山信仰儀式ための塔あり	2つのチベット仏教寺院あり	なし	なし	なし
	お墓の位置		西南方向の山に位置する	なし、村の北側にある川に水葬	お墓なし。川に水葬もしくは火葬：青稞未播種の季節には火葬が行われ、播種後には水葬が行われている	村の上にある山林には墓地があり、水葬が行われる家もあった	聚落の西側には山林に位置する。家庭によって水葬、土葬、火葬などが行われる	土葬と火葬が主な埋葬方法で、土葬は村の上方または下方に行われた	集落の南側の山、土葬もしくは水葬を行う	お墓なし、金沙江に水葬	主に土葬が行われて、時折火葬の習慣もある。お墓は南側の山に位置する	東側の山に位置する	東側の山に位置する	東側の山に位置する
	中心（性）・主軸の有無		大仏寺は中心である	なし	なし	なし	なし	なし	仓覚街	なし	なし	格蘭街	なし	水路
	船着場の有無と位置		なし	なし	なし	なし	なし	なし	なし	なし	なし	なし	なし	ある、舟運は2018年までに終わった。
	街道を含むか		交易中心地：北門街、四方街、仓房街	なし	なし	なし	なし	なし	交易中心地	なし	なし	交易中心地：格蘭街	なし	なし
層３（共同体）	おもな生業	ヒアリングなどから	商業、観光業	松茸、農業（チンコ、イモ）、畜牧	農業（チンコ、イモ）、松茸、畜牧	農業（チンコ、イモ）、畜牧	農業（チンコ、イモ）、畜牧	農業（チンコ、イモ）、畜牧	農業、商業	農業（チンコ、コーン）、畜牧、薬材	農業（野菜、米）	農業（米など）、商業	農業（コーン）、薬材（バイモなど）	農業（米、タバコ、野菜）
	お祭り（いつ、どこで）	地名辞典、神社website、ヒアリングなどから	農暦の初一、十五、農暦とチベット暦の新年に焼香して仏を拝む。松赞林寺で仏陀を迎える祭り	農暦の初一、十五、農暦とチベット暦の新年に焼香して仏を拝む。松赞林寺で仏陀を迎える祭り	農暦の初一、十五、農暦とチベット暦の新年に焼香して仏を拝む。松赞林寺で仏陀を迎える祭り	農暦の初一、十五、農暦とチベット暦の新年に焼香して仏を拝む。松赞林寺で仏陀を迎える祭り	農暦の初一、十五、農暦とチベット暦の新年に焼香して仏を拝む。松赞林寺で仏陀を迎える祭り	農暦の初一、十五、農暦とチベット暦の新年に焼香して仏を拝む。松赞林寺で仏陀を迎える祭り	農暦の初一、十五、農暦とチベット暦の新年に焼香して仏を拝む。松赞林寺で仏陀を迎える祭り	農暦の初一、十五、農暦とチベット暦の新年に焼香して仏を拝む。松赞林寺で仏陀を迎える祭り	農暦の初一、十五、農暦とチベット暦の新年に焼香して仏を拝む	2000年から政府によって貿易が正式化され、毎月6日、16日、26日が大規模な交易日となった	なし	なし
	水源	ヒアリングから	現在は水道水を使用する。昔は大佛寺の山脚にある泉から水を運んでいた	以前の水源はジディ川から供給されたが、現在は水道水が敷設された	2013年以前、村の水供給は下の川から水を背負ってくるか、雪山から水を引いて村の上部の貯水池に入れる必要があった。2013年に水道水が接続された	用水困難。以前は村の下流からの川や山の上の雪解け水を背負って使用した。現在は水道水が整備されたが、灌漑用水は依然として山下の水たまりから供給された	用水困難。水道水は日常の飲料水に使用されたが、灌漑用水は主に山中から供給された	用水困難。2002年以来水道水が供給されたが、灌漑用水は主に雪山からの水に依存する	水道水、灌漑用水は山からの水源	水道水、灌漑用水は山からの水源	水道水、灌漑用水は山からの水源	水道水、灌漑用水は山からの水源	池、水道水（2015年から）	水道水は安定して供給されていない。飲料水は山中の水路から又は家庭の井戸水を利用する

Figure 3- 13. Settlements Analysis Card (SAC) in Shangri-La mountainous region, China

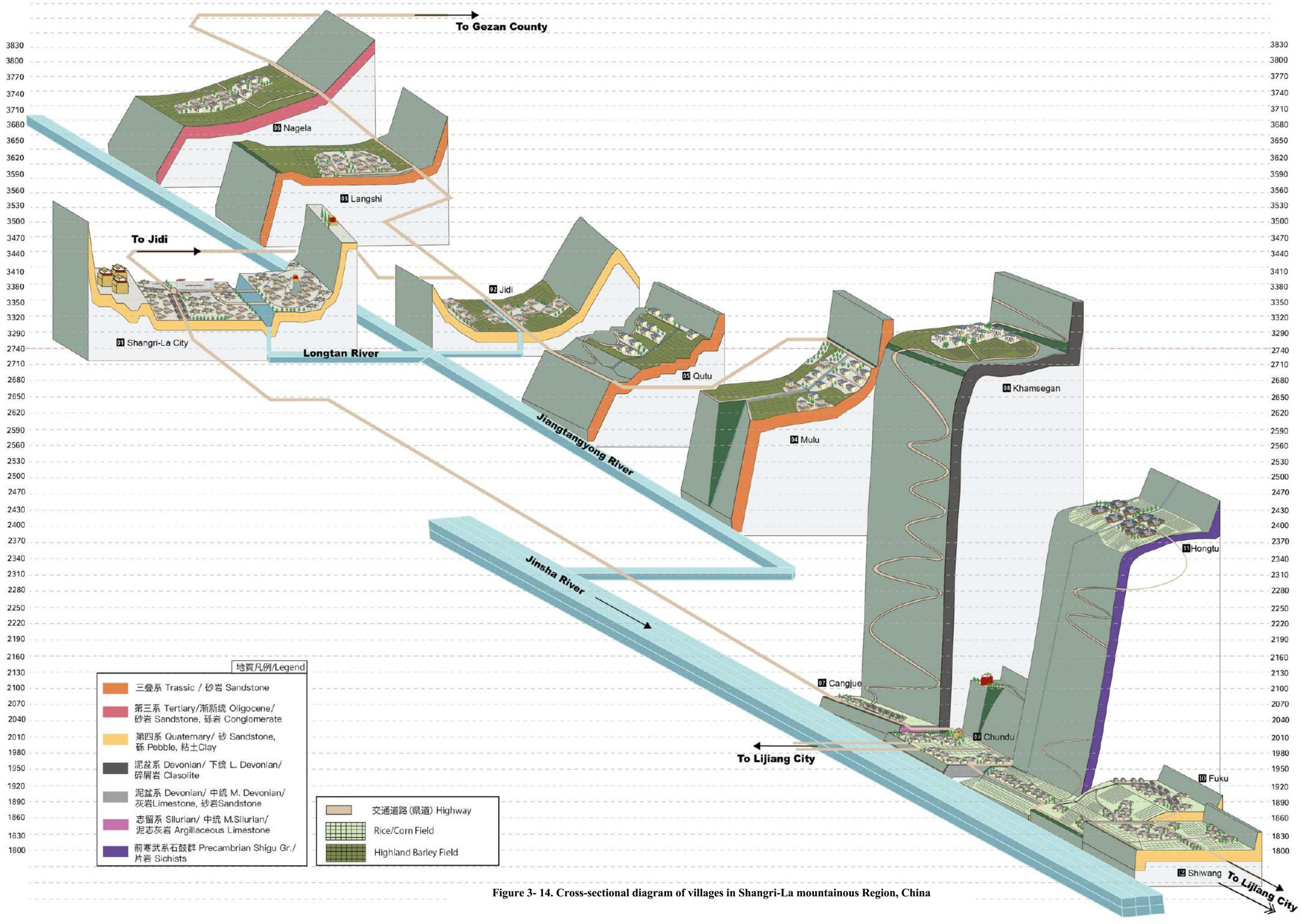


Figure 3- 14. Cross-sectional diagram of villages in Shangri-La mountainous Region, China

Based on the settlements analysis card (SAC) along the Jinsha River Basin in the Shangri-La region and the 3D cross-sectional diagram of settlement locations, this chapter obtained similar results similar to the Japanese study.

3.4.1 Highland settlements are not necessarily equivalent to high-altitude settlements, as demonstrated by comparing the Shangri-La cross-sectional diagram and Khamsegan.

Shangri-La is located at an elevation of 3,300 meters, which is 700 meters higher than Khamsegan's 2,600 meters. Topographically, Shangri-La County belongs to the basin type, while Khamsegan belongs to the riverbank mountain terrace type. In contrast to Shangri-La, Khamsegan has a nearly 600-meter vertical elevation difference, resulting in a greater distance between the settlement and the Jinsha River Basin.

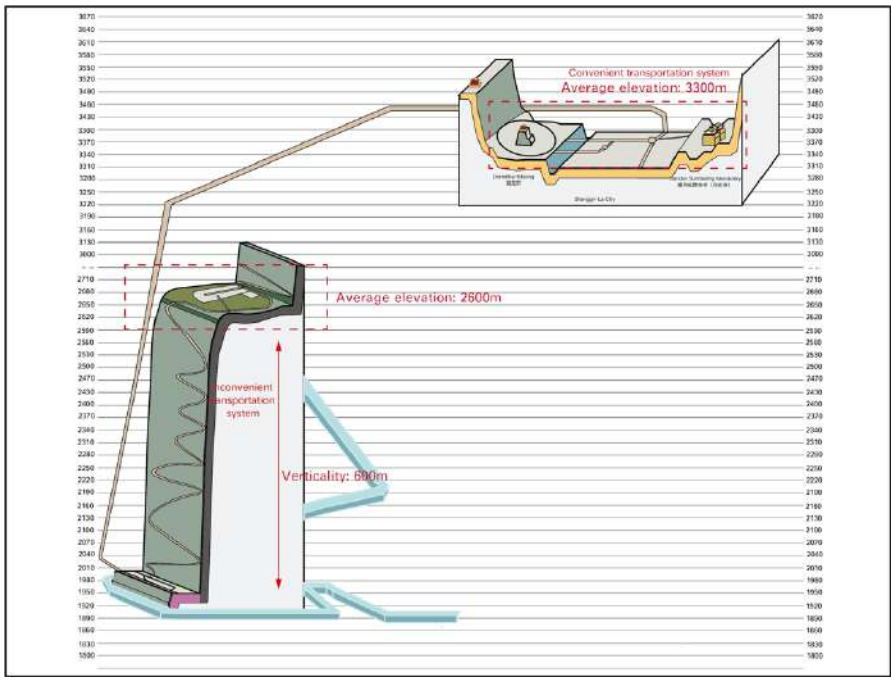


Figure 3- 15. Comparison diagram of Khamsegan and Shangri-La[57]

As noted in the Japan section, transportation, as a significant factor affecting settlement accessibility, also influences settlement openness. As the most extensive trade and economic center in the entire Diqing Tibetan Prefecture, Shangri-La boasts a well-developed transportation system. In contrast, Khamsegan, which has lower transportation accessibility, is connected to the economic center below by a winding mountain road. Prior to the construction of the highway, residents of Khamsegan had to travel four hours on foot or horseback to reach Cangjue, where they could engage in trade. Therefore, in the high-altitude world with an average altitude of 3000 meters, elevation alone is not the sole criterion for determining whether a settlement is a highland settlement. The vertical elevation difference that maintains a sense of remoteness in the settlement and accessibility to transportation are also important factors to consider. Comparatively to Shangri-La, Khamsegan resembles a highland settlement.

1) The importance of vertical elevation differences for highland settlements

[57] Drawn by the author.

In the research conducted at Shangri-La, there are two settlements with vertical elevation differences exceeding 500 meters: Khamsegan, a Tibetan settlement, and Hongtu, an ethnic Lisu settlement. Both settlements are situated on mountain terraces along the river basin, with steep slopes elongating the distance between them and lowland villages, enhancing the remoteness of the highland settlements. Only a winding mountain road provides access to these settlements, making transportation difficult. Before constructing transportation routes, villagers had to rely on primitive methods, such as carrying goods on their backs or using horses, to interact with other settlements along the mountain ridges (Figure 3-16).

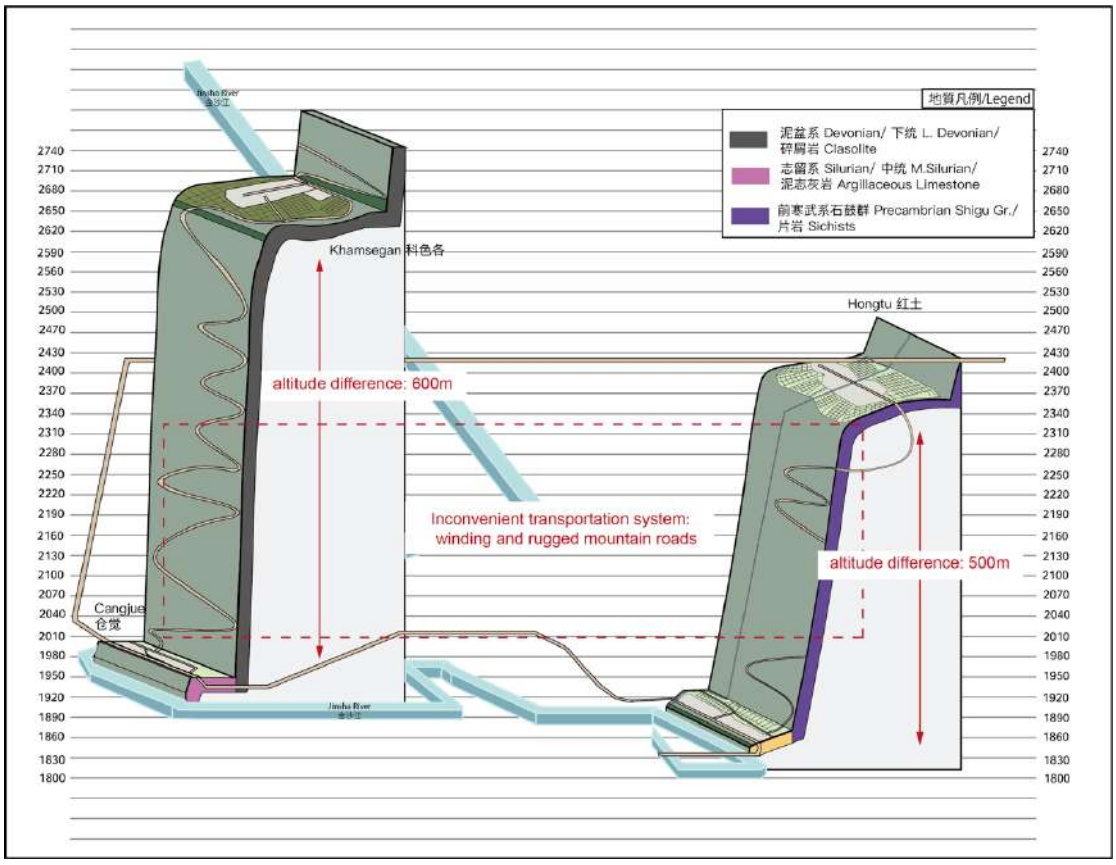


Figure 3- 16. Section diagram of Khamsegan and Hongtu[58]

3.4.2 The interactive connection exists between the highlands and lowlands: from the view of river basin

According to planar analysis, each settlement lies within the radius of influence of small-sized economic centers nearby. Since Shangri-La City is the most significant economic center, its service radius encompasses all settlements. A network of economic exchange has developed between the settlements since then: essential commodities are traded in nearby economic hubs, and when these hubs are unable to meet the villagers' needs, villagers' journey to Shangri-La for economic transactions. For example, highland settlements like Khamsegan and Hongtu, which have significant vertical elevation differences, are typically located inside the service radius of small economic centers. Villagers need only descend from the mountains to purchase daily living commodities, and the majority of their travel time is spent traversing the vertical elevation

[58] Drawn by the author.

disparities between highlands and lowlands. According to the economic purchasing needs, these highland residents autonomously decide whether to go to the lower-altitude settlements or the larger economic center of Shangri-La above. They "cleverly" engage in interactions with the lowland economic centers. The study's results on the economic flow between highland and lowland settlements in the Shangri-La region are similar to the research in the Japanese section. The connection between high-altitude settlements and low-altitude settlements can be established through both large and small economic centers.

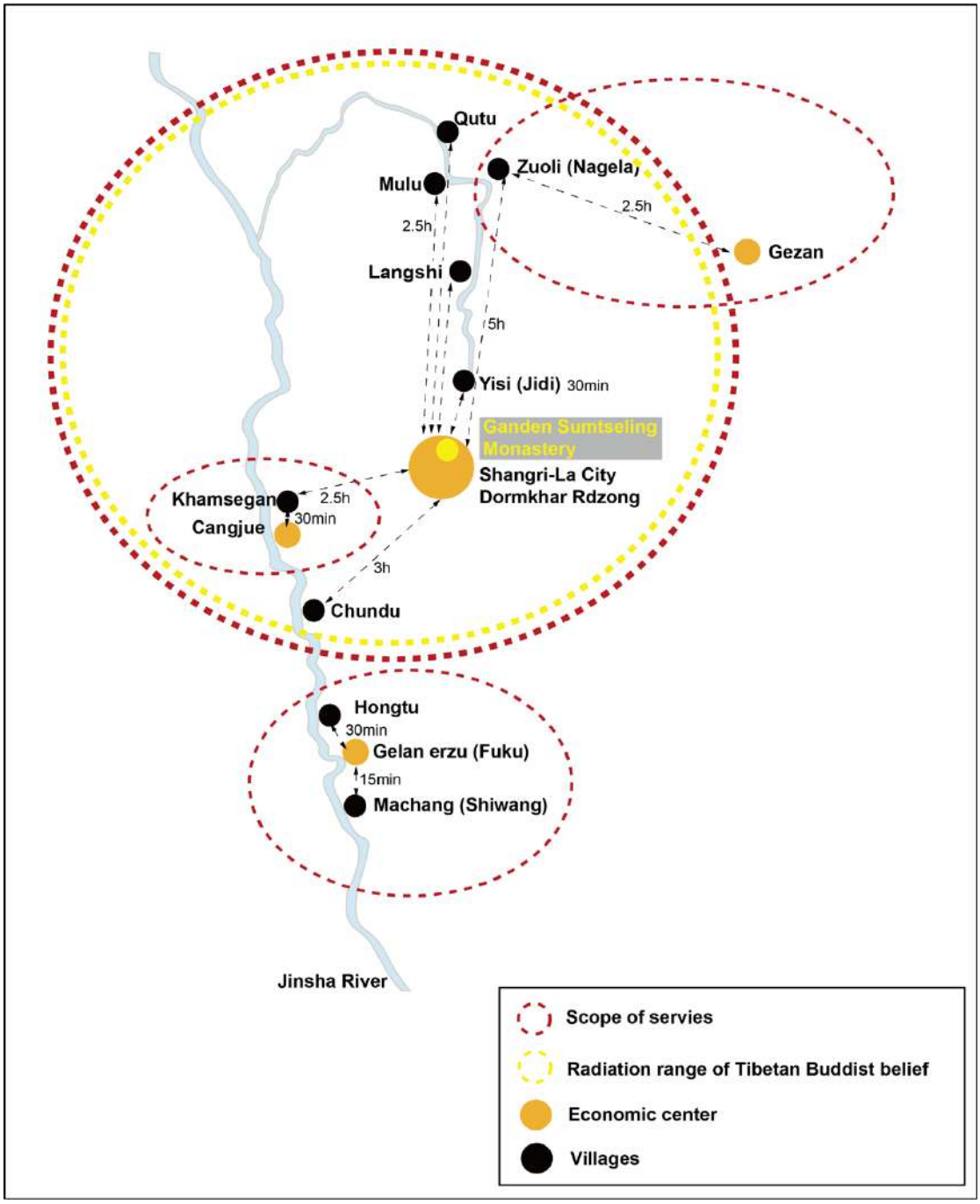


Figure 3- 17. Simplified diagram of the service radius of the economic & culture center[59]

[59] Drawn by the author.

As a city of ethnic minorities, Shangri-La has its unique faith practices. The preliminary research stage in this chapter involved simulating the patterns of faith, economic, and cultural exchange between settlements constructed by the Tibetan Buddhist Ganden Sumtseling Monastery based on historical data. Although there is no longer any economic exchange at the monasteries, cultural exchange continues. In Chundu, for example, although the village has two Tibetan Buddhist temples for daily worship, the villagers still visit Ganden Sumtseling Monastery on special Tibetan holidays such as Tibetan New Year, Saga Dawa Festival. Within Ganden Sumtseling Monastery, the eight ecclesiastical district organizations that once administered the Shangri-La region have been preserved and renamed Khamtsan[60], which serves as temples of worship for villagers from various regions. Based on regional affiliations, residents from different villages worship Chacang (an ordinary temple) and the Khamtsan specific to their region. For example, Dormkhar Rdzong Ancient Town residents' worship Dormkhar Rdzong Khamtsan, Chundu and Khamsegan honor Rongpa Khamtsan, and Jidi villagers' worship Khamtsan, etc. Tibetan Buddhism's cultural service radius promotes communication between highland and lowland villages. Ganden Sumtseling Monastery is located in a high-altitude area with lowland characteristics, and it attracts gatherings and cultural communication of highland residents during special occasions.

3.4.3 The distribution flow of crop production system

The flow between settlements is also reflected in crop production. The settlements located on the north and south sides serve as crop production areas, continuously supplying crop products and sideline products to Shangri-La City, the largest economic exchange center (as shown in Figure 3-18). Settlements in the south mainly focus on cultivating corn and rice, while those in the north prioritize barley, potatoes, matsutake mushroom harvesting, and pastoralism.

[60] Khamtsan：康参，ཁམས་ཚན་，is a monastic unit formed based on the regional division of the source of monks in Tibetan Buddhist monasteries.

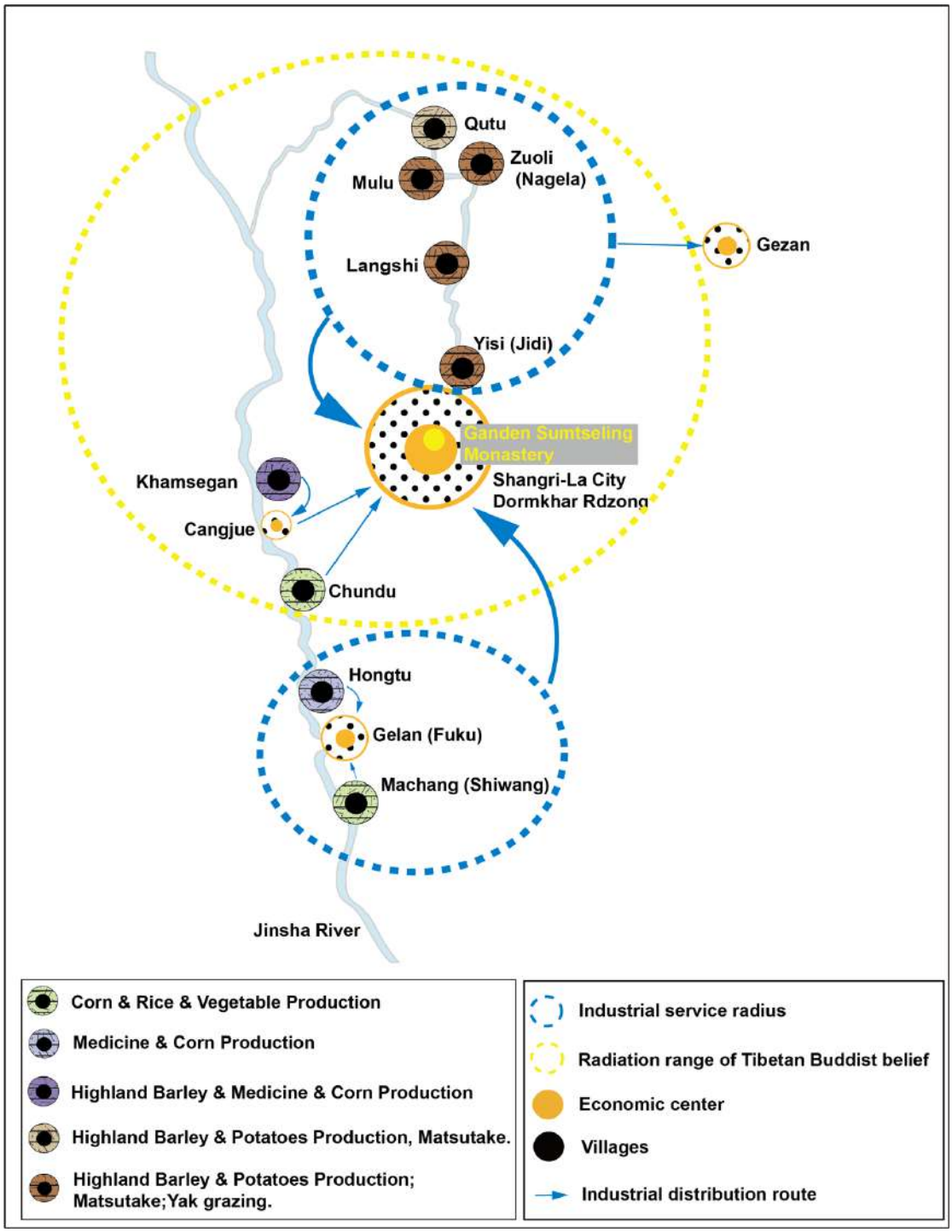


Figure 3- 18. Simplified diagram of the industrial route

Among all settlements, Khamsegan and Hongtu stand out as unique. Compared to the rest of the settlements, these two communities cultivate a greater variety of agricultural products, and they are the only settlements whose primary means of income are derived from medicinal herb cultivation. The rationale lies in the mountains behind the two settlements, where Fritillaria, a precious traditional medicinal herb, is cultivated. Residents gather these herbs from the medicinal mountains above the settlement and trade them for essential goods in the lower settlements. Approximately 600 meters of altitude difference results in a wide diurnal temperature range, making

it unsuitable for cultivating rice, which is suitable for lower elevations. Corn, which grows up to an elevation of 3600 meters, has become a major agricultural crop in these two settlements. Moreover, Khamsegan, being a Tibetan-populated area, also cultivates highland barley, which serves as the agricultural cultivation boundary for highland barley in the research area. Overall, the uniqueness of Khamsegan and Hongtu as highland settlements is shaped by the significant vertical altitude difference and the rich environment of mountainous resources behind the settlements, as illustrated in the cross-sectional diagram below.

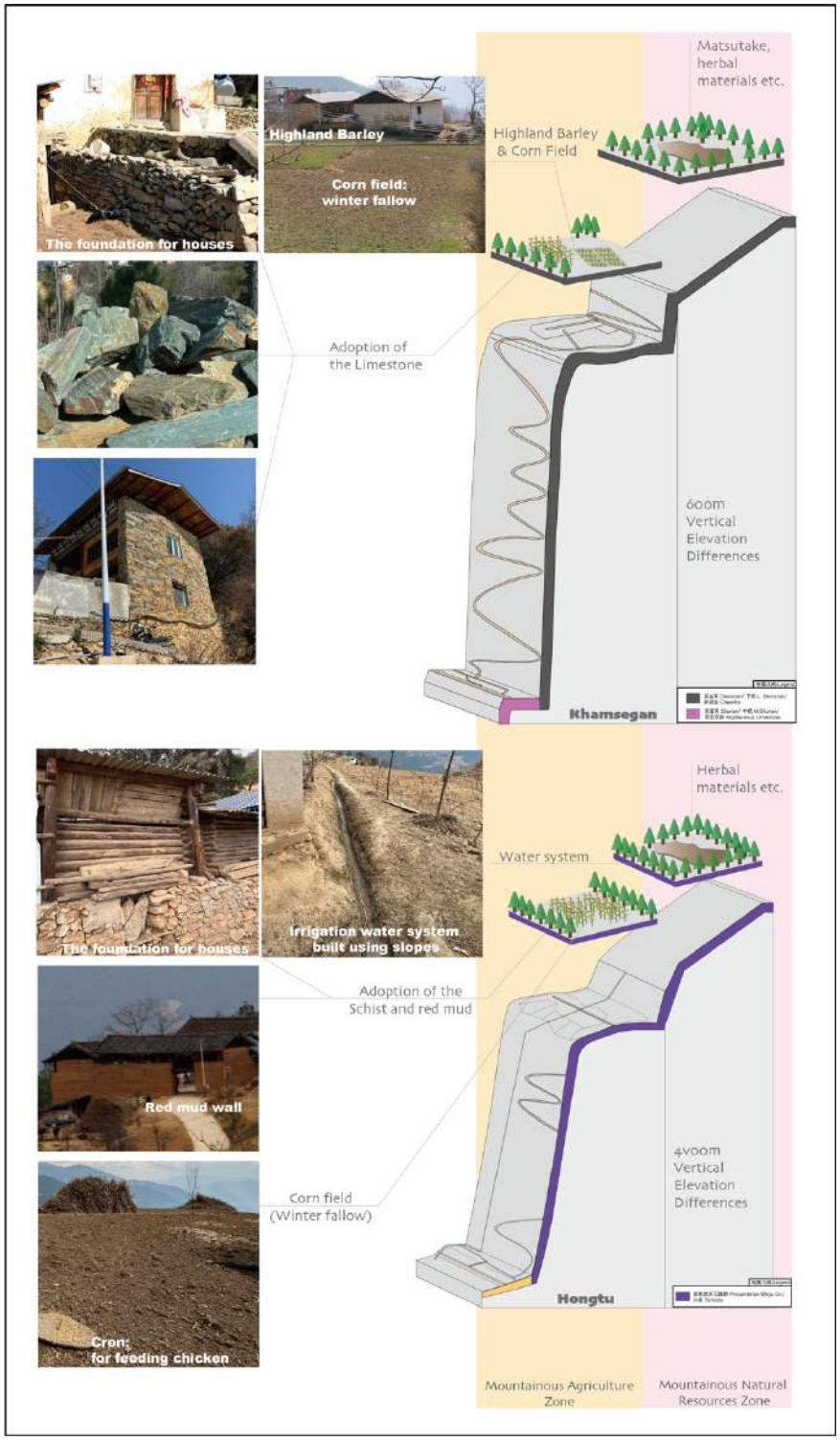


Figure 3- 19. The livelihoods within Chinese Highland settlements (Khamsegan and Hongtu)

The cross-sectional diagram confirms that the living environment of highland settlements consists primarily of two components. The first part is the distinctive agricultural cultivation environment, and the second is the unique mountainous resources. Villagers freely traverse mountain paths to exchange daily needs with lower settlements. Vertical elevation differences produce a sense of vertical distance in these settlements, thereby emphasizing the "high" characteristics of highland communities. By wisely utilizing the unique natural resources of high-altitude settlements, a production goods circulation cycle has thus been established, flowing towards low-altitude settlements.

In the agricultural cultivation research of the highland settlements Khamsegan and Hongtu, it has been discovered that corn, as a crop, serves various functions and forms in both highland communities. From the corn kernel to the corn cob and finally to the corn stalk, it is intricately linked to the overall life operation system, as illustrated in the diagram below.

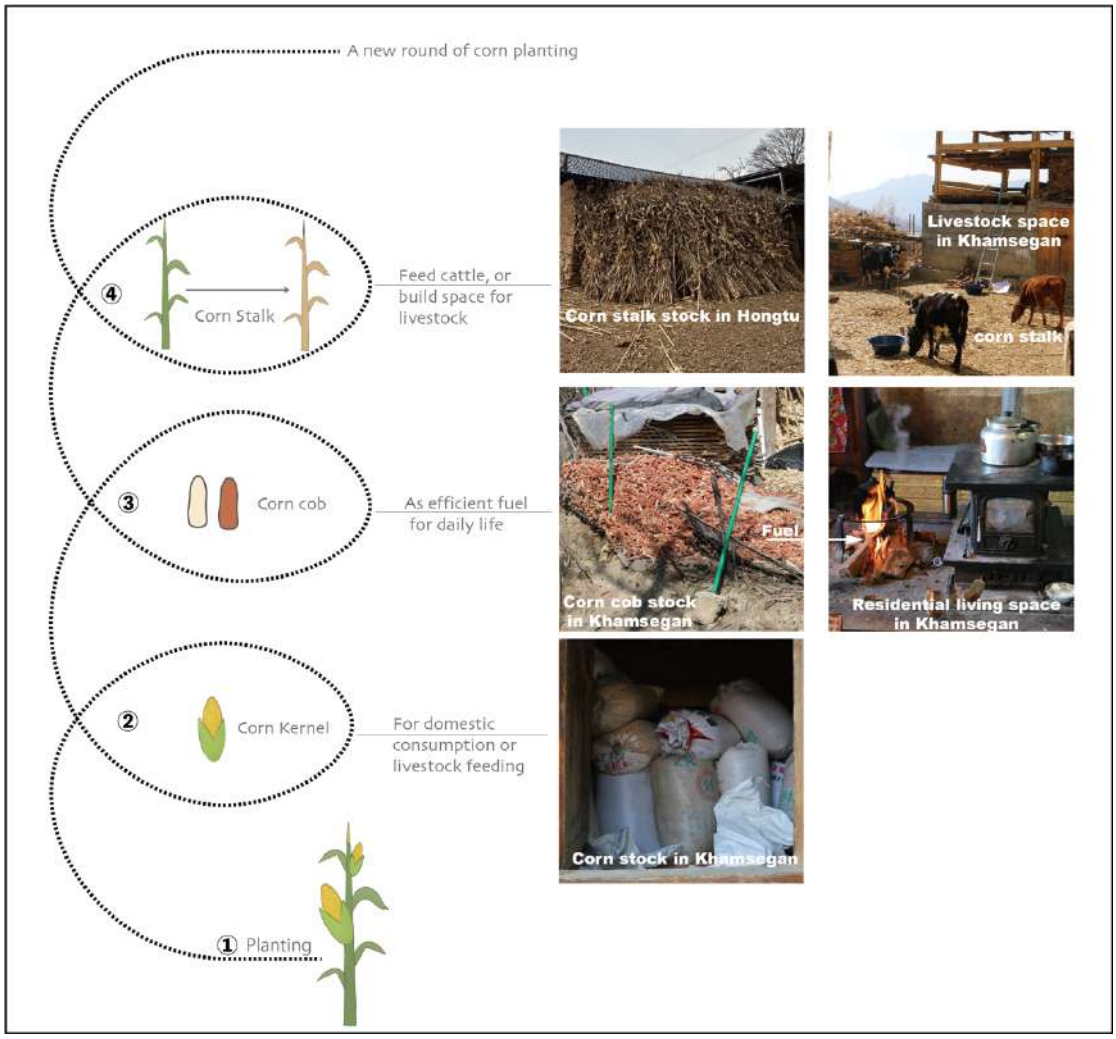


Figure 3- 20. The cycle of corn planting and utilization within Khamsegan and Hongtu

Residents use corn kernels for daily consumption or to feed livestock, such as mountain chickens in Hongtu village. The corn cobs serve as the primary combustible material for heating and cooking for highland residents, as seen in Khamsegan. Meanwhile, corn stalks are essential as feed for livestock, particularly cattle, and are commonly used in the construction of spaces for domestic animals. James Scott's Zomia research on highland settlements in Southeast Asia also

found that corn is one of the most widely cultivated crops among residents of highlands. This is because corn is suitable for dry land, resilient to cold, easy to cultivate, and has a high yield. This section of the study also confirms that crops like corn, which are adaptable to high-altitude environments, and each component positively impacts residents' daily operations, are typical representatives of agricultural planting varieties in highland settlements.

3.5 Conclusion

Through the compilation of village survey data and the creation of village location cross-sectional diagrams, this section reveals that in the Shangri-La region, which has an average elevation of over 3,000 meters, there are still high-altitude settlements in the lowlands and low-altitude settlements in the highlands. Settlements at 2,600 meters exhibit distinct independent and closed characteristics, in contrast to those at 3,600 meters, due to transportation inaccessibility and vertical elevation differences. Based on the plane analysis of economic flow between highlands and lowlands, organized through on-site research, economic and cultural flow directions have been revealed. The results presented in the analysis are highly similar to the interaction patterns of highland and lowland settlements in the Japanese section. Chapter 5 will discuss a comparative analysis of highland villages in two regions to determine the common characteristics.

3.6 References

1) Ma Lifang. (2002). Geological atlas of China. Beijing, Geology Press.
(中) 马丽芳主编.（2002）. 中国地质图集. 北京, 地质出版社.
2) Li Hui. (2010). Ecosystem Risk Assessment and Spatial Differentiation of Ecological Security in the 'Three Parallel Rivers' World Natural Heritage Site. National Natural Science Foundation of China (Grant Number: 50968017).
(中)李晖. 2010."三江并流"世界自然遗产地生态风险评价及生态安全空间分异研究，中国国家自然科学基金委员会（编号：50968017）
3) Diqing Prefecture Ethnic and Religious Committee. (1986). Status in Diqing Tibetan Autonomous Prefecture.
迪庆藏族自治州概况.《迪庆藏族自治州概况》编写组. (第1版. ed.). (1986). 云南民族出版社.
4) People's Government of Shangri-La County (2015). Shangri-La County Annals.
香格里拉县人民政府.（2015）.香格里拉县志.
5) Danzhu Angben. (2003). Tibetan Dictionary. Gansu People's Publishing House.
(中)丹珠昂奔. (2003). 藏族大辞典. 甘肃人民出版社.
6) "Geographical Gazetteer of Zhongdian County, Yunnan Province (1986)
(中) 云南省中甸县地名志.(1986)
7) People's Government of Zhongdian County (1997). Zhongdian County Annals.
(中) 中甸县人民政府.（1997）.中甸县志.
8) Government of Jiantang Town (2005). Jiantang Town Annals.
(中) 建塘镇政府.（2005）. 建塘镇志.
9) Sob-nams gya-mtsho. (2007). Collected works of Sob-nams Gya-mtsho in Tibetan Studies. Kunming, Yunnan Nationalities Publishing House.
(中) 索朗甲楚. (2007). 索朗甲楚藏学文集
10) Duan, S. 1939. Annals of Zhongdian County. Intergration of Chinese Local Chroicles.83.
段绶滋. (民国)《中甸县志》
11) Comprehensive Local Chronicles of China. (2009). Yunnan Prefecture and County Chronicles Compilation. Phoenix Publishing House.
中國地方志集成. (2009). 雲南府縣志輯. 鳳凰出版社.
12) Tanihata Hisao, Kanamaru Yoshiko. (2017). Ethnic Minorities of the Hengduan Mountains in China. Kokon Shoin.
田畑 久夫, 金丸 良子. (2017). 中国横断山脈の少数民族. 古今書院.
13) 金丸良子, カナマルヨシコ. (2008) "雲南チベット族の牧畜業-尼汝村タンディアオ家の事例として." 中国研究 16: 17-43.
14) 田畑久夫, and 金丸良子. (2008) "雲南チベット族の牧畜業 タンディアオ家の場合." 日本文化人類学会研究大会発表要旨集 日本文化人類学会第 42 回研究大会. 日本文化人類学会.
15) Jiang, C. 1997. Yunnan ethnic housing culture. Yunnan, Kunming: Yunnan University Press.
(中)蒋高宸. (2016). 云南民族住屋文化.
16) Zhai, H.,Bai, W., and Wang, L. 2008. Yunnan Tibetan House. Yunnan Science and Technology Press.
(中)翟辉, 柏文峰, & 王丽红. (2008). 云南藏族民居.
17) 谷内麻里子, & 塩谷壽翁. (2011).チベット族の住まいにおける人びとの空間認識と行

動から見いだされる空間概念 中国雲南省シャングリラ（中甸）県・プーレイの場合. 日本建築学会計画系論文集, 76(667), 1585-1592.

Taniuchi, M., and Shiotani, T. 2011. A Study on the Spatial Concept of Tibetan People as Defined by their way of Spatial Recognition and Behavior in their Dwelling Life: In the case of Pooh-lei village in Shangri-La (Zhongdian) prefecture, Yunnan, China. J.Archit. Plan. AIJ vol 76, 667: 1585-1592.

18) 云南省区域地质志 / 云南省地质矿产局. （1990）. 地質出版社.

Yunnan Provincial Regional Geological Records / Yunnan Geological and Mineral Resources Bureau . (1990). Geological Publishing House.

Chapter 4. 本論・The mobility of residential construction styles between highland and lowland settlements carried by artisans

Chapter 4　本論・The distribution of residential construction styles between highland and lowland settlements carried by artisans

4.1 Overview

In researching villages, it is imperative to consider not only the visible features such as village structures and geology, but also the invisible features such as the organization or local community[61] of the village. Most settlement residents directly participate in dwelling construction, whether as designers or builders. As a result, the invisible aspects of local organizations are closely intertwined with the visible aspects of residential buildings. For example, researchers can discern changes in the internal village systems by studying the evolution of dwelling layouts or spatial usage. By examining shifts in dwelling construction methods, it is possible to assess changes in village organization. Investigating historical changes in the craftsmen who built folk houses can shed light on interactions between different settlements. These undocumented forms of village organization reflect the most critical elements of communication between the village as a whole and other settlements. Furthermore, this stands as a notable advantage of architecture when arranging the historical narrative of settlements by examining physical structures.

According to the conclusions drawn in the previous chapters, the vertical elevation difference within a settlement is an essential factor in determining a settlement's independence. Moreover, it has been observed that there is an economic center, to a certain extent, serving as a conduit for communication between highland and lowland areas. This chapter examines whether there are other imperceptible circulation patterns beyond economic and production logistics that explain the distribution between highland and lowland settlements. According to the results of on-site investigations, construction artisans are responsible for orchestrating the circulation linking highland settlements to lowland settlements. Artists' mobility influences various aspects of residential properties, including architectural styles, spatial layouts, and construction materials, in addition to economic and production flows.

4.2 The Japan Section

4.2.1 Literature review

Research on Japanese traditional houses have a relatively early history, and it can be divided into two main periods: pre-World War II and post-World War II[62]. The systematic study of Japanese traditional houses began with the establishment of the Hakuboukai ("白茅会"). The first phase of research primarily focused on collecting the visual characteristics of traditional houses from various regions across Japan, whereas the second phase, building upon the first, examined aspects such as human-scale dwelling spaces and levels of daily life (Figure 4-1). It is worth mentioning that scholar Wajiro Kon held an influential position in both phases, as his research and theories formed the cornerstone of modern Japanese traditional house research. His book, "Japanese Traditional Houses" [1] (日本の民家), published in 1922, was the first systematic introduction to Japanese traditional houses in modern times. Subsequently, the collection "Collected Works of Wajiro Kon" [2] (今和次

[61] In this chapter, "村落集団" is represented by terms "village organization" or "local community", and been recognized as an invisible aspect of a rural settlement.

[62] This study provides a brief overview based solely on the distinction between the pre- and post-World War II periods and discusses a few scholars and their works relevant to this research. For a more detailed classification and comprehensive information, refer to Nishiyoshi Eichi's master thesis published in 2012 at Nakatani Norihito Lab, titled as "調査資料抽出にみる集落町並研究の史的展開　その建築史学的特質".

郎集), published in 1971, provided even more detailed records of hand-drawn sketches and his architectural theoretical thinking.

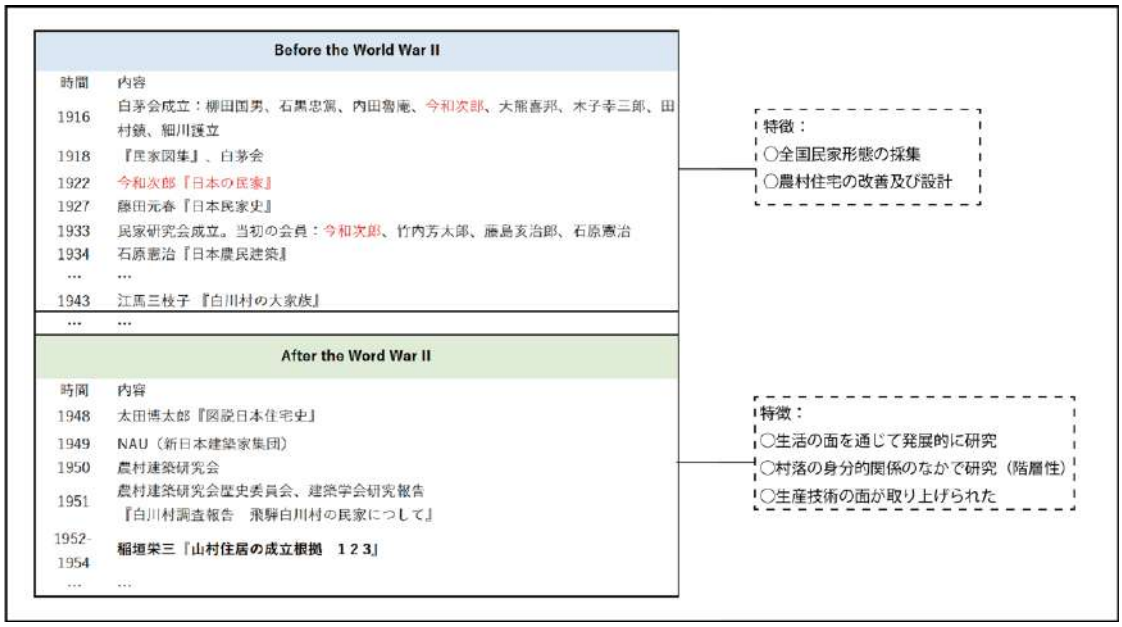


Figure 4- 1. Schematic diagram of Japanese folk house research[63]

Wajiro Kon asserted that when researching traditional houses, it is crucial to consider two major factors: the inclination of houses to adapt to the natural environment and the influences of culture on house design. The first factor, adaptation to the natural environment, refers to how humans construct houses based on the natural resources available in their living environment, leading to variations in building materials and styles among traditional houses. He categorized environmental conditions into three types: cold regions, warm regions, and hot regions. The second factor, "the regulatory influence of culture on house design," comprising four components: ethnicity or nationality, historical administrative or management conditions specific to villages, transportation conditions, and industrial conditions. Transport, the most significant influencing factor, is considered the primary medium of culture dissemination since all cultures spread with the movement of transportation. Simultaneously, transportation development also gives rise to central and peripheral cultures. The theory of Wajiro Kon was shown in the diagram below (Figure 4-2).

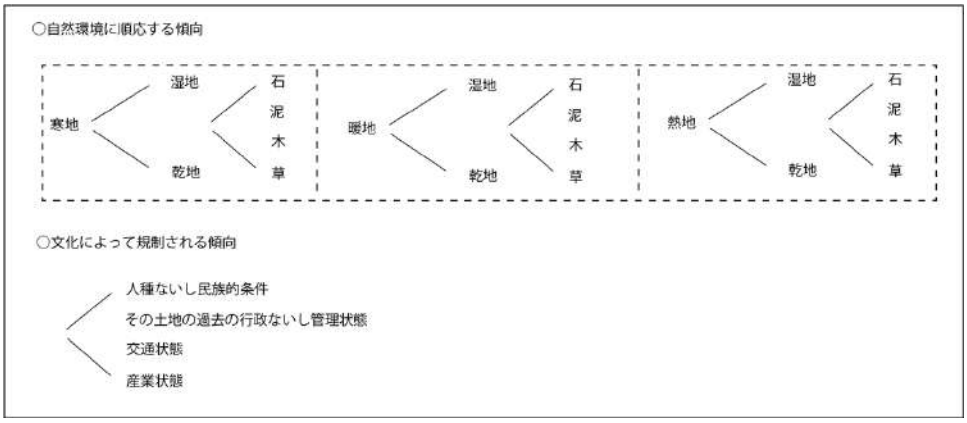


Figure 4- 2. Concept map of Wajiro Kon's folk house theory[64]

[63] Drawn by the author based on the content from Reference "稲垣栄三,伊藤鄭爾,田中稔,大河直躬. 民家研究の成果と課題. 建築史研究, 第 21 号、22 号."

[64] Drawn by the author based on the content from Reference "今和次郎. (1971). 今和次郎集 第 2 巻 民家論. ドメス出版."

Wajiro Kon's graphical records clearly document different types of traditional houses in various regions of Japan, reflecting the trend of "houses adapting to natural environment". The hand-drawn records and his theory were since becoming the basis for subsequent and ongoing research in traditional Japanese architecture.

Over the past century, Japan has undergone profound changes in its economy and living environment, which have led to significant changes in residential spaces and landscapes of traditional Japanese residential houses. As a general rule, Japanese traditional folk houses exhibit different styles depending on the characteristics of the villages; for example, fishing villages have a different exterior and form than mountain villages. Nonetheless, rapid urbanization, enhanced transportation systems, shifts in industrial structures, and various other factors have contributed to a diminishing divergence in contemporary Japanese folk houses, particularly regarding materials, spatial layouts, and other attributes (Rekiseikai, 2012; Nakatani et al, 2011)[4), 5)]. As part of the field research conducted for this study, practical surveys or measurements of traditional folk houses were not conducted due to the large sample size of settlements and the subtle differences between residences. Correspondingly, earlier literature research findings indicate that Inagaki had conducted detailed research on the recognized highland settlements and residences in Shirakawa Village, Japan, as early as 1952, elucidating the uniqueness of highland dwellings and settlements. Therefore, Inagaki's research theories are cited as a basis for analysis in this section (Inagaki, 1952)[6), 7), 8)].

4.2.2 The distribution between different villages triggered by Yui in Shirakawa Son [6), 7), 8)]

Within rural Japan, a system of mutual labor assistance among villagers, known as "Yui[65]," where households exchange labor to complete tasks such as constructing dwellings. A characteristic of Yui is that it facilitates equal labor exchange through short-term stays and can be utilized when households require a large workforce. All the residents of Shirakawa Village are members of the Yui organization, and the only way to build residential houses is with the assistance of Yui. Consequently, Yui is an internal village system directly related to village residence formation and development.

According to Inagaki, Yui engaged in various foundational activities related to housing construction in Shirakawa Village, including sawing wood, compacting foundations, erecting second floors and above, and roofing. When a newly constructed dwelling was being constructed or an existing roof needed to be repaired within the village, an area was formed around that dwelling, and Yui within that area was gathered to provide labor. Through Yui, traditional building techniques were transmitted to villagers, while at the same time, Yui maintained the traditional construction methods. The Yui system continued to operate despite the involvement of professional craftsmen from outside the village, such as carpenters, in building houses in Shirakawa. Furthermore, there is a well-defined division of labor between Yui and professional craftsmen from the outside, as illustrated in the Figure 4-3.

[65] Yui,ユイ、家々の間で労働力を交換し合って作業をお互いに助け合うことである。地域により発音が変化し、「イイ Ii」、「エエ Ee」、「ヨイ Yoi」、「ヨイコ Yoiko」などと呼ばれる。

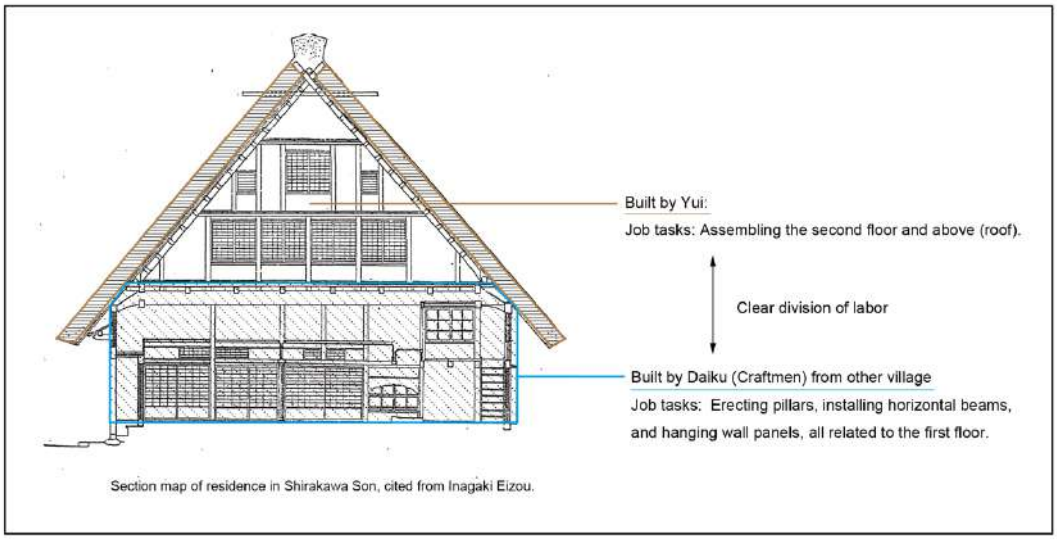


Figure 4- 3. The construction division map of folk house in Inagaki's research[66]

The existence of Yui has allowed the traditional roofing construction technique, as seen in Gassho-zukuri (The shape of roof as shown in Figure 4-3 since ancient times, to be passed down through generations in the "hands" of villagers. Additionally, Inagaki's research revealed that Yui was a cross-village initiative. By confirming the materials and labor contributions from different villages during house construction, it was found that Yui primarily operated within five villages: Oomaki(大牧), Magari(馬守), Ookubo(大窪), Nodani (野谷), and Hokiwaki(保木脇), with Oomaki(大牧) at its center. Through the transmission of Yui from one village to another, bridging challenging geographical distances, traditional Gassho-zukuri folk houses were handed down to various villages within Shirakawa Area.

[66] The base map is sourced from Reference " 稲垣栄三. (1953). 山村住居の成立根拠-2. *建築史研究/建築史研究会 編*, (12), 20-29." Re-edited by the author.

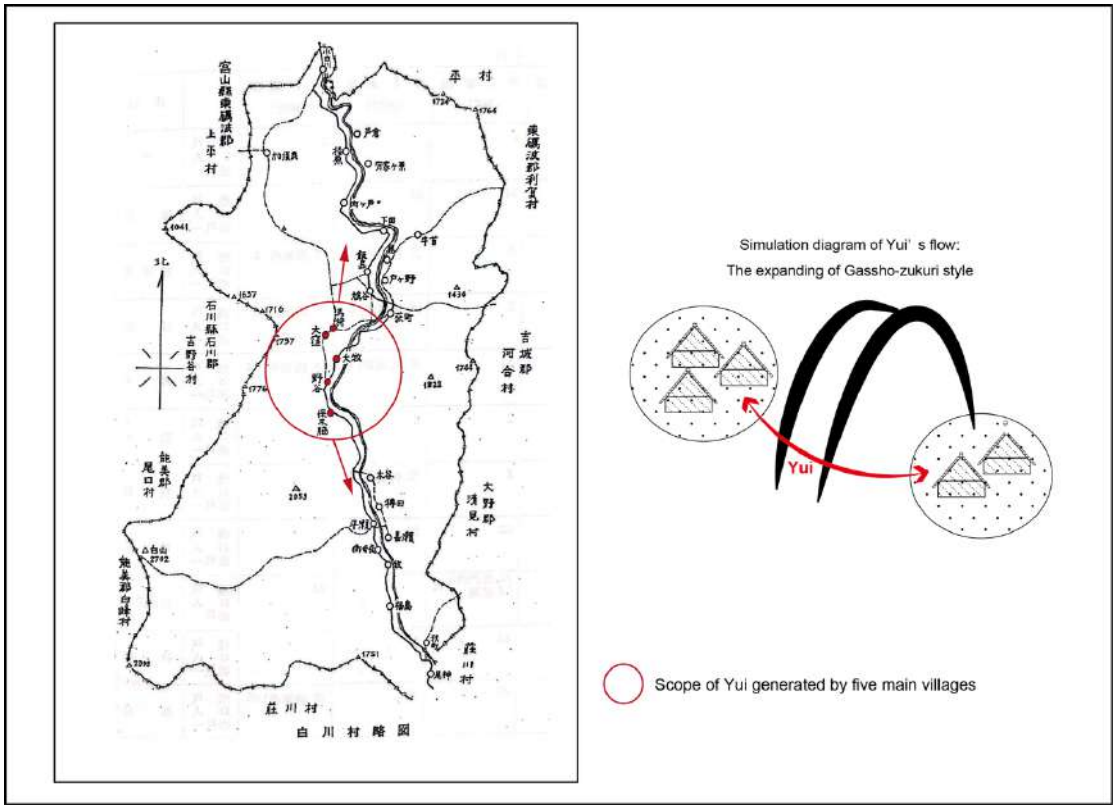


Figure 4- 4. The village communication network diagram created by Yui[67]

During a time when transportation was severely limited, the mobility enabled by Yui among different villages played a pivotal role in disseminating the architectural style of these traditional houses across the highland region of Shirakawa Son. This diffusion, with Oomaki Village at its core, spread outward circularly, exemplifying a communication network connecting settlements through Yui. Consequently, the Gassho-zukuri style became the predominant architectural style for residences throughout the Shirakawa region, and it continues to be visible more than a century later.

In summary, craftsmen Yui's mobility is a key factor in the continued existence of Gassho-zukuri, now recognized as a world heritage site. Simultaneously, it is the primary reason for the diffusion of architectural techniques from highland settlements, particularly from Oomaki village to the surrounding areas. Whether such mobility instigated by craftsmen is universal will be discussed in the next section.

4.3 The China Section

The economy of Shangri-La has experienced a boom period in the development of tourism during the past two decades, which improved the living environment and standard of residents accordingly. Upgrades have also been seen in the Shangri-la's transportation system, which not only links the tourist with various tourist attractions but also enhances direct connections between Shangri-La and various ethnic groups, including the ethnic Bai and the Han in the south. Communication between different ethnic cultures fosters the deeper integration of multi-ethnic

[67] The left side map is sourced from Reference "稲垣栄三. (1952). 山村住居の成立根拠-1. 建築史研究/建築史研究会 編, (10), 1-14." Re-edited by the author.

cultures in Shangri-La. This fusion of multi-ethnic cultures directly reflects on Shangri-La's Tibetan residential houses, including changes in building materials, construction styles, architectural layouts, and diversity in construction labors. The changes of traditional Tibetan villages in Shangri-La is a gradually undergoing process. For the reasons outlined above, it is imperative to investigate the impact of artisans from other regions on Tibetan residences in Shangri-La.

Jidi Village was selected as research object in the Shangri-La section. As a traditional Tibetan farming settlement in Jiantang Town, Jidi is located approximately 30 kilometers from Shangri-La's city center (as shown in the Figure 3-17). Jidi is called Jedi in Tibetan, meaning a prosperous and safe land[68].As a plateau basin settlement, Jidi village belongs to the plateau semi-pastoral mountainous area, and its average elevation is approximately 3300 meters. Jidi village has a long history, with Tibetan people living here for more than a thousand years[69]. Furthermore, Tibetan Buddhism is the only belief that plays a vital role in the villagers' daily lives.

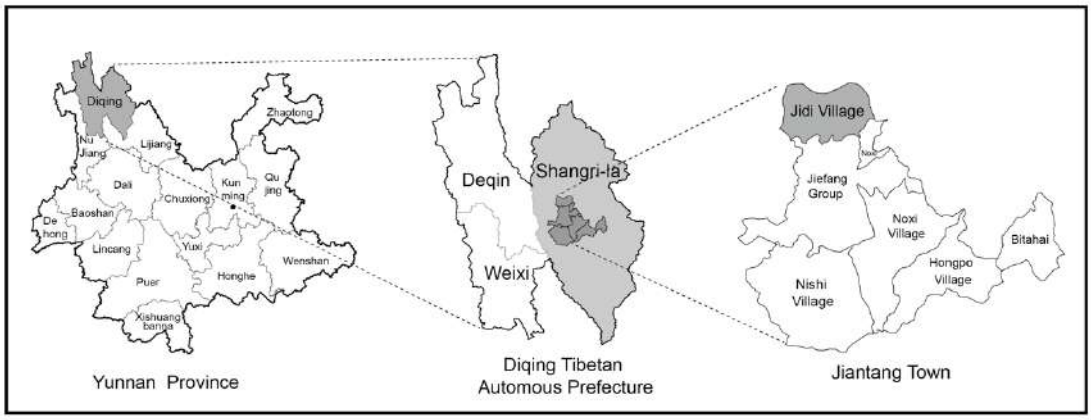


Figure 4- 5. Geographical location map of Jidi village[70]

Norio Yamamoto pointed out that the margin of the farming boundary plays a major role in deciding if arable farming or pastoral farming would be dominant in Tibetan settlements due to the frigid natural environment of the Tibet plateau (Yamamoto, 2019)[9]. Settlements with higher altitudes above the line would have primarily pastoral farms, while arable farming is prevalent in the settlements located below the boundary. However, both farming modes existed in Jidi Village because of its unique geographic conditions that own plains for farming and high mountains for grazing. Additionally, the semi-pastoral mountainous plateau is ideal for cultivating Matsutake, making Jidi village famous as the home of Matsutake. Since the 1990s, Matsutake from Jidi village has been increasingly exported to other cities, including Beijing and Shanghai[71]. Jidi Village's Matsutake trading system expanded dramatically with Shangri-La's tourism industry and eventually exported to overseas countries in recent years. As a result, the industrial structure of Jidi village has evolved from a traditional farming and grazing settlement to a modern one that incorporates agriculture, animal husbandry, and the Matsutake trade. Therefore, Jidi village has become one of the typical traditional villages in Shangri-La which has been greatly impacted by economic growth,

[68] Referred to "/ *Gaz tt r of Jiantang / own in S angri-la County* "published by the Jiantang Town People's Government in 2009, p.88.
[69] Referred to "/ *Gaz tt r of Jiantang / own in S angri-la County* "published by the Jiantang Town People's Government in 2009, p.89.
[70] Drawn by the author.
[71] Referred to "/ *Gaz tt r of Jiantang / own in S angri-la County* "published by the Jiantang Town People's Government in 2009, p.149.

providing a valuable model for studying the modernization of its internal Tibetan dwellings. Hence, this section selected Jidi village as the case study to explore the contents and influential factors of modernization in Tibetan residential dwellings.

4.3.1 Literature Review

Research into Tibetan residential architecture began in 1950 and has been conducted for nearly 70 years. Scholars such as Xu Zongwei have summarized the different types and designs of Tibetan residential buildings in China (Xu, 2004)[10]. During the last few years, researchers have extensively investigated the internal constructions of Tibetan dwellings, which are all common to different Tibetan communities. As the largest structure in the living space of Tibetan residential buildings, the central column has become a symbol of Tibetan culture because it has the same spiritual function as the Mandala of Tibetan Buddhism (He, 2009)[11]. Fireplace, which consumes the firewood and raises the temperate of the living room in residential buildings has also been treated as a living spiritual symbol of Tibetan dwellings (Wang, 2006)[12]. The pictorial decoration of the interior wall implies the affluence of the family (Yu, 2019)[13].

As for the earliest recording of Tibetan residential dwellings in Diqing, it can be traced back to the local Chronicles published in 1939 (republished in 1991)[14], which pointed out that Tibetan dwellings in plateau areas are mostly two-story buildings with three rows of columns (Duan, 1939)[14]. At this stage, the Tibetan dwelling house was just a single building with walls made of rammed earth on three sides and a wooden corridor in front of it. As a matter of roof style, Jiang had divided the Tibetan dwellings in Diqing into two types: the plateau shingle style (Gaoyuan ShanpianShi, 高原闪片式), which built at high elevations area with a pitched roof made of fir trees for easy drainage; and the river valley fortress style(HeGu DiaoBaoShi, 河谷碉堡式), which built at low altitudes region with flat roofs for easy water storage or drying of grain (Jiang, 1997) [15]. The Tibetan dwellings in Shangri-la are in the first category. Zhai pointed out that the selection of building materials and spatial layout of the Tibetan residences in Shangri-La are deeply rooted in the Tibetan Buddhist culture and also the regional culture (Zhai, 2008)[16]. According to Japanese scholar Mariko Taniuchi, the Tibetan residences in Shangri-La were divided into sacred and unsacred areas from top to bottom by interpreting their spatial location as the Buddhist Hall (located at the top), the living area (located on the second floor), and the livestock (located at the bottom) (Taniuchi, 2011) [17]. Shan interpreted Tibetan dwellings in Shangri-La have strong characteristics of adopting local materials including trees and stones (Shan et al, 2013) [18]. Recent studies on Tibetan residential buildings have often emphasized the impact of modernization and urbanization. Earlier in 2003, Ewing already noted that Han nationalities brought the first step of modernization into Tibetan areas by introducing innovative materials such as cement and brick as the improvement of infrastructure in 1990 (Ewing, 2003) [19]. Dong proposed in 2013 that Tibetan residences in Shangri-La gradually developed a mixed style of buildings with traditional wooden structures enclosing non-traditional modern auxiliary structures, such as kitchens and bathrooms (Dong, 2013) [20]. As a result of the impact of globalization and urbanization, Tibetan dwellings gradually lose their ethnic characteristics in the process of reconstruction and renovation (Zhao, 2020) [21]. In consequence, the building's style becomes chaotic.

Scholars have long noticed the evolution trend of Tibetan dwellings in Shangri-La, but so far, no researchers have yet to investigate where the impact factors came from and how Tibetan dwellings in Shangri-La changed. However, no studies have been conducted to determine whether such changes are caused by the distribution of settlements between highland and lowland regions.

Therefore, this section will tentatively explore whether the movement between highland and lowland settlements has led to alterations in the architecture of highland Tibetan residences.

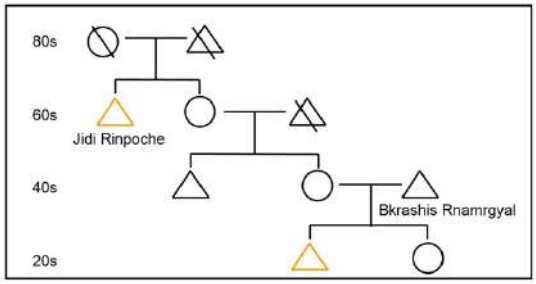
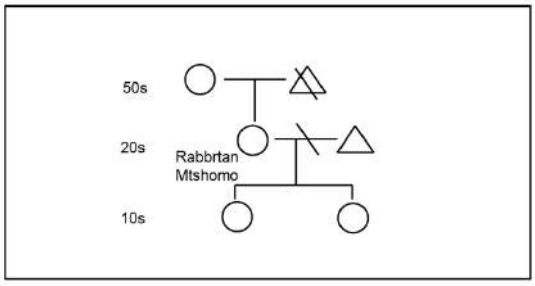
4.3.2 Methodology

Studying the specific impact of modernization on residential dwellings requires understanding both the current level plans and the architectural evolution. Field investigation provides insight into residential houses' visual status. Conversely, capturing the invisible historical process of residential buildings necessitates interviewing residents about their family evolutionary histories. Hence, this section adopts the compound method of field mapping and resident interviews to analyze the characteristics and influencing factors of Shangri-La modern Tibetan dwellings in Jidi village. The field survey was conducted in 2020. In the sample selection process, consideration was given to the age of the house, the building renovation status, the composition of family members, the economic situation, and cultural beliefs. Taking into consideration the elements outlined above, four typical residential buildings were selected as research objects. A primary focus of the interview with the householder was to inquire about the family history as well as the history of architectural evolution. Family history serves not only to reflect the economic and cultural background but also to explain the unique characteristics of Tibetan dwellings, considering the volume of building space and the influence of Tibetan Buddhism on the family. In examining the history of structural changes, emphasis was placed on verifying whether artisans from other ethnic groups participated in constructing Tibetan residential buildings. Eventually, planar and spatial distribution maps of the four houses were drawn based on the collected data. Moreover, a presentation of the features of modern Tibetan dwellings in Jidi village was provided as part of the history of architectural evolution.

4.3.3 Research object

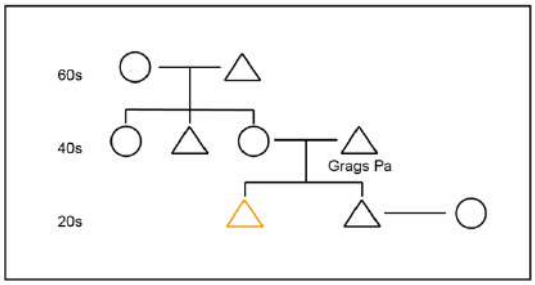
Considering the year and newness of the buildings, we selected one of the most representative newly renovated Tibetan houses, two traditional buildings that have not been renovated, and one of the average buildings that are transitioning from tradition to modernity. In addition, since Tibetan Buddhist culture is deeply related to Tibetan dwellings, the sample data can be divided into two categories: those who have family members learning in monasteries and those who do not. Jidi village has a famous Rinpoche, revered as "Jidi Rinpoche" by villagers, whose family house is one of the most ancient and traditional Tibetan buildings. Although Rinpoche returned to secular life ten years ago, his family remains a landmark in Jidi village. To determine the representativeness of traditional style in Jidi village, Rinpoche's family house was used as a research sample. Currently, Rinpoche's nephew-in-law, Bkrashis Rnamrgyal, is in charge of the household. Some low-income families in Jidi village cannot afford renovations, so the traditional buildings have remained in their original condition. Among them, we found Rabbrtan Mtshomo's family and selected it as the second research subject due to the authenticity of the housing. Most families maintain a medium economic level and have a comfortable living environment representing the most ordinary residences in Jidi village. The house of Grags Pa has thus been chosen as the third study subject. The newest house representative is Norpo, who rebuilt his home five years ago to celebrate his brother's Geshe degree. We selected it as the fourth subject. Four study subjects were numbered House A to D, with information and study founding listed below.

Table 4- 1. Basic information about family oral history[72]

No.	Householders	Family Composition
A	Bkrashis Rnamrgyal	 Ora History of House A: Bkrashis Rnamrgyal's uncle-in-law is Jidi Rinpoche, the first person to achieve the highest degree of Buddhism and has a very high reputation in the village. The wooden structure was constructed during Rinpoche's tenure and completed voluntarily by the villagers. Jidi Rinpoche's family house is the most traditional and ancient architectural representative of Jidi Village. Although Rinpoche returned to secular life ten years ago, this house remains a landmark in Jidi village. The youngest son of the owner is currently learning in the monastery.
B	Rabbrtan Mtshomo	 Ora History of House B: No one in this family entered the temple. The economic situation of the whole family has been at a low level for the past few years because there is no male labor force. Due to financial difficulties, the house was never renovated after local Tibetan artisans constructed it.

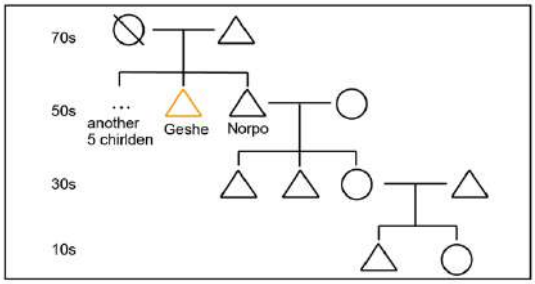
[72] Drawn & wrote by the author according to the site-investigation.

C Grags Pa



Ora History of House C:
The economic status of the entire Grags Pa family is middle level in the village, and his son is currently learning in a Buddhist monastery. If Grags Pa's son successfully obtains Geshe's degree, the family plans to renovate their house.

D Norpo



Ora History of House D:
Norpo's younger brother obtained a Buddhist Geshe degree in Lhasa five years ago, which is currently the highest degree in Jidi village. Norpo's family reconstructed their house in honor of this accomplishment.

Table 4- 2. Basic information of residential dwellings

No.	Years of construction	Types of Building	Source of economic income	Whether family members work or learn in a monastery.
A	40	Wooden structure, Traditional dwelling	AF, MT, PF.	1, male, general degree.
B	30	Wooden structure, Traditional dwelling	AF, MT, PF.	0.
C	15	Wooden structure, Traditional dwelling	AF, MT.	1, male, general dgree.
D	5	Wooden structure, Renewal dwelling	AF, MT, PF.	1, male, Geshe degree.

AF: Arable Farming. MT: Matsutake Trade. PF: Pastoral Farming.

The four houses are all civil structures and use basic building materials, including wood, stone, and mudbrick. Regarding the construction age, House A is the oldest house, which has existed for over forty years. In contrast, House D is the newest building that was rebuilt on the site of the old house five years ago. The basic information of each family, including population and economic

situation, has been collected and sorted out based on interviews. The economic sources of the four families are mainly dependent on agriculture, among which the Matsutake Trade in July and August has also become the primary source of revenue in recent years. Besides, House A, B, and D are still engaged in animal husbandry. In the composition of family members, male members of House B C D are entering the Tibetan Buddhist monastery, which gives the three families a direct connection with the temple. Based on the above information, this study conducts the following detailed research.

4.3.4 Results

1) Floor plans and section maps of Tibetan dwelling houses

The following floor plans and section maps have been prepared to analyze the research subjects' current plan and spatial layout system using surveying and mapping data.

Figure 4- 6. Floor plans of four Tibetan dwellings in Jidi village[73]

[73] Drawn by the author.

BH: Buddhist Hall
LR:Living room, **BR**: Bed Room, **RR**: Rest Room, **K**: Kitchen, **SR**: Storage Room, **G**: Garage
LS: Livestock Shed, **CR**: Corridor
Thabka: Fire Ponds, **Chura**: Water Cellar, **Barka**: Middle Column.


No.
1st Floor
2nd Floor
3rd Floor
House C
N
SR, G
SR
SR
LR, K
Barka
Chura
Thabka
BR
SR
BR
UP
DN
CR
RR
BR
SR
BR
LR, K
Thabka
BH
CR
House D
N
SR
CR
LR, K
Barka
Chura
Thabka
SR
BR
BR
BR
UP
CR
RR
SR
BR
BH
Thabka
LR, K
BR
BR
CR
RR
BH: Buddhist Hall
LR:Living room, BR: Bed Room, RR: Rest Room, K: Kitchen, SR: Storage Room, G: Garage
LS: Livestock Shed, CR: Corridor
Thabka: Fire Ponds, Chura: Water Cellar, Barka: Middle Column.
0 1 2 4 8(m)

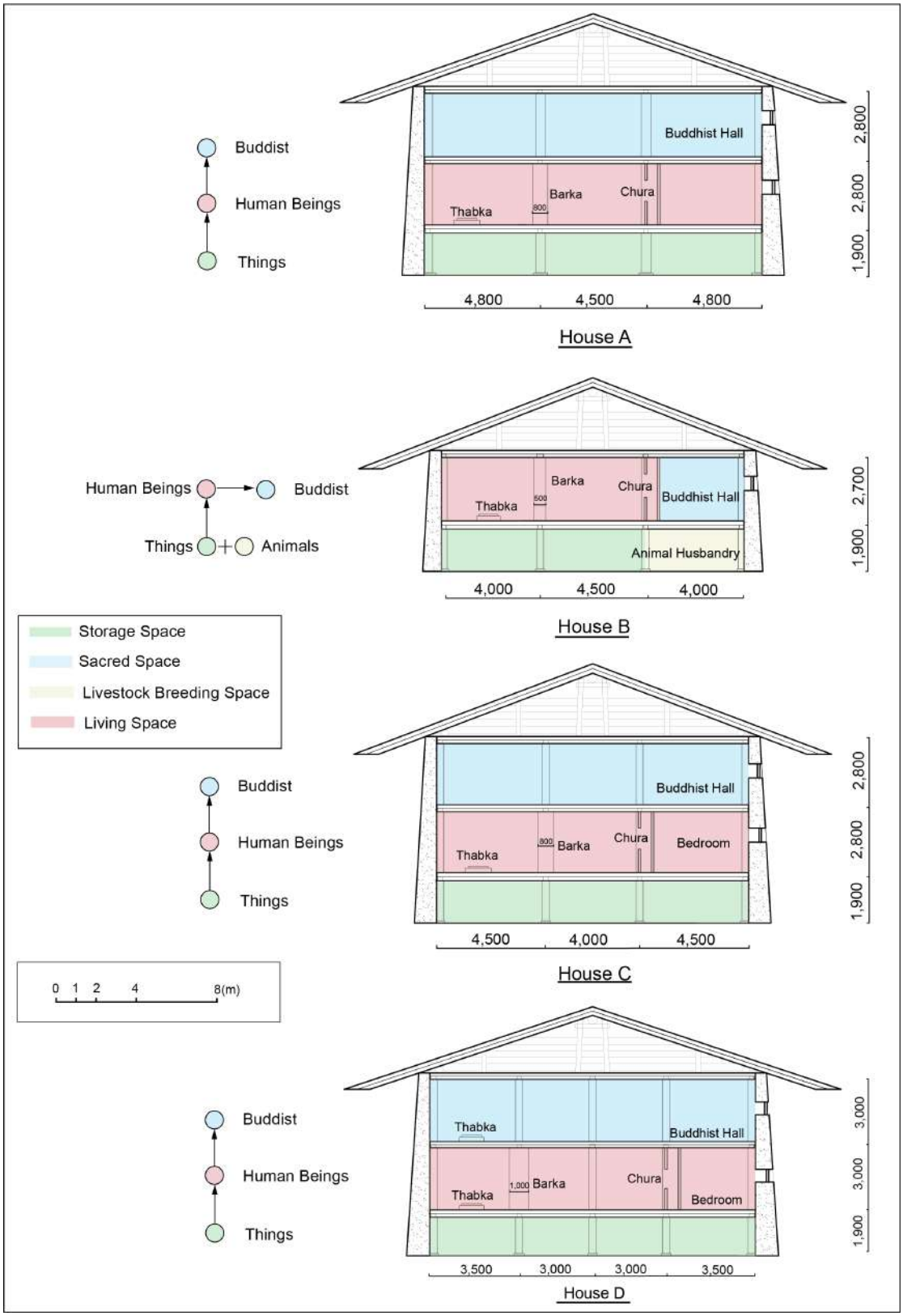


Figure 4- 7. Section maps of four Tibetan dwellings[74]

[74] Drawn by the author.

The sectional drawing provided a precise spatial distribution of the four houses. Each dwelling A, C, and D had three floors with a more stereoscopic space than dwelling B. The first floor is for storage, the second for living, and the third is a place of worship with a Buddhist Hall built on it. It represents a living hierarchy that consists of Buddha, people, and objects from top to bottom. Unlike the three-floor type, the layout of two-floors House B is vague due to its compact size, as the first floor is dedicated to storage and feeding livestock, and the second floor is for both living and worshipping. The sacred space is smaller and does not extend to a single floor, and the animals live under the same roof as humans. A further discussion of the specific reasons for the apparent differences is necessary.

2) Spatial distribution and floor plan of the sacred space

Sacred space holds great significance in Tibetan residences as it encapsulates the spirit and faith of the Tibetan people. There is a unique form of this space known as the Buddhist Hall, which houses Buddha statues and scriptures so that residents may participate in daily religious activities there. Additionally, the spatial location and size of the Buddhist Hall in residences are directly related to whether family members attend the temple.

There are two categories of relationships between the Tibetan family and Buddhist temples in Jidi village. First, no one in the family joined the Buddhist temple. Second, someone within the family attended a monastery and obtained a general or higher Buddist degree. If there are no Buddhist members in the family, then the Buddhist Hall can be on the same level as the living room. Accordingly, the family does not need to construct a new floor for the Buddhist Hall. Taking House B as an example, the sacred space and living space are co-located on the second floor of the building. In contrast, the Buddhist Hall must be on the top floor of the building if a member of the family enters the temple. In this case, the concept of sacred space is no longer limited to the Buddhist Hall but also includes the kitchen, bedroom, fire pond, toilet, and other necessary living spaces specially designed for the member. As a result, the faith area has evolved into an entire room containing a sutra recitation hall and essential living spaces. House A, C, and D were all built on the third floor to provide sacred space for the exceptional members enrolled in the Buddhist temple. Tibetan Buddhist temples' degree hierarchy system also influences sacred spaces in Tibetan dwellings, with a higher degree resulting in a more luxurious design. As the member of House D's family is currently a non-secular Rinpoche with a Geshe degree, the oratory decoration is more luxurious than any other.

As a result, villagers frequently assess the present circumstances of a family solely based on the residential building, as all Tibetan dwellings in Jidi village adhere to the hierarchy established by Tibetan Buddhism. A two-story residence signifies that no one from the family entered the Buddhist temple, whereas a three-story home suggests the presence of family members engaged in studies at the temple. Additionally, observers can gauge the level of stylite in the temple by assessing the degree of decoration on the third floor.

3) The current usage condition of traditional facilities in living space

Apart from the sacred space, the living area on the second floor is another crucial element of Tibetan houses. This space has three unique structures: a central column called Barka in the Diqing Tibetan language, a water cellar called Chura, and a fire pond called Thabka. The creation of the Barka can be traced back to the ancient Tibetan religion Bon, which asserted building a tree-like structure in the house to express nature's worship. The Barka is thicker than any other column and is the most prominent structure in the whole building. The general diameter of the Barka varies from

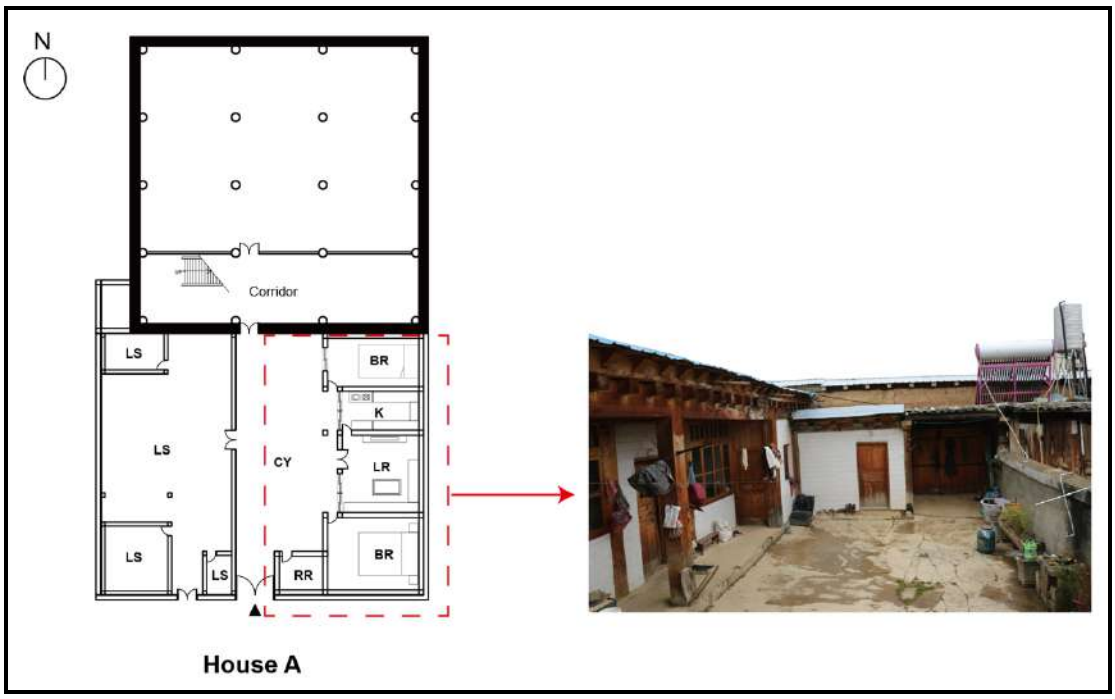
50cm to 100cm in Jidi village, while the other usual columns are under 40cm. Furthermore, the thickness and ornamentation of Barka are directly related to the family's economic status and relationship with a Buddhist temple. House B has the smallest Barka with simple decoration due to no one entering the temple, while House D owns the biggest and most luxurious ornament because the stylist has a Geshe degree. Houses C and D are modestly sized, measuring between 70 and 80cm. Barka has transformed from a symbol of faith to a calling card representing the identity and status of one family.

Traditionally, the Chura in all four houses was the storage space for domestic water due to the lack of running water pipes and played a crucial role in fire prevention owing to the high prevalence of wooden frames. However, modern Tibetan residential houses in Jidi village have been equipped with water pipes that eliminate the need to store domestic water daily. Although the Chura continues to retain water, it is primarily designed for fire safety. Conversely, Chura's external ornamentation has evolved into a decorative symbol, serving a similar purpose as Barka. House B has the most straightforward decoration, while House D boasts the most elaborate one. In the same space, the Thabka stove, once essential for Tibetan cooking, has been replaced by modern electrical appliances, making the time-consuming and heat-inefficient Thabka obsolete.

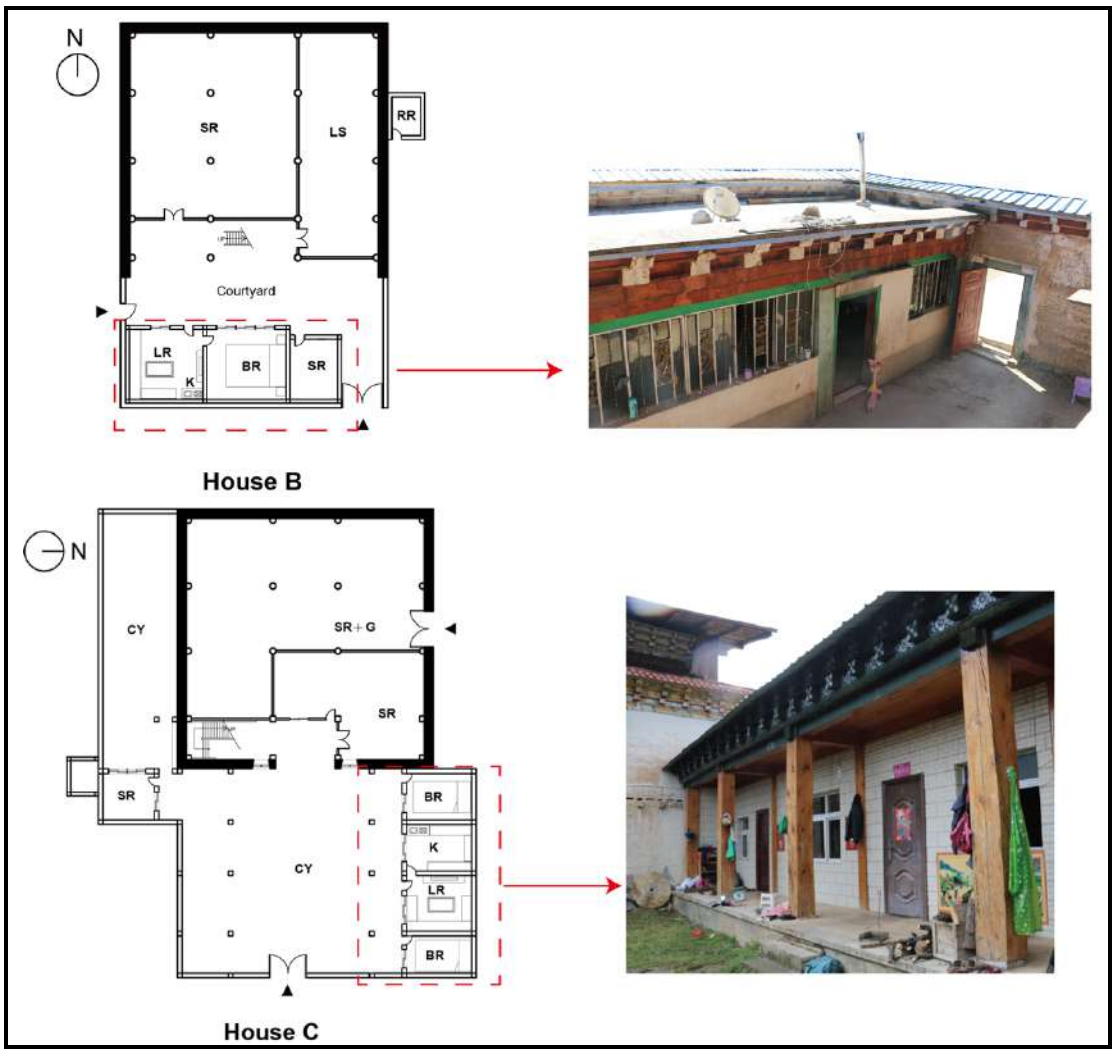
With the improvement of the living environment in Tibetan dwellings of Jidi village, the original purposes of traditional facilities within the living space have gradually diminished. Notably, decorative functions are increasingly replacing utilitarian ones. The changes in residential houses' internal spatial structure are evident, but the specific reasons underlying these changes still require confirmation through analysis.

4) The current overall floor plan of Tibetan residences

According to the investigation, the existing Tibetan dwellings in Jidi Village have a composition that extends beyond traditional Tibetan architecture. Instead, each comprises one or two attached non-traditional buildings situated adjacent to the main house or in front. These supplementary structures, one-story in nature, deviate from the traditional Tibetan house in terms of appearance and modulus, yet they maintain Tibetan stylistic elements through carvings and decorations. In recent years, the predominant architectural style in Tibetan dwellings in Jidi Village has gradually shifted towards a combination of ancient main buildings and modern detached bungalows. Surveying and mapping the attached buildings to the four research objects was undertaken in order to identify current living conditions in both traditional and extended spatial contexts (Figure 4-8).



House A



House B

House C

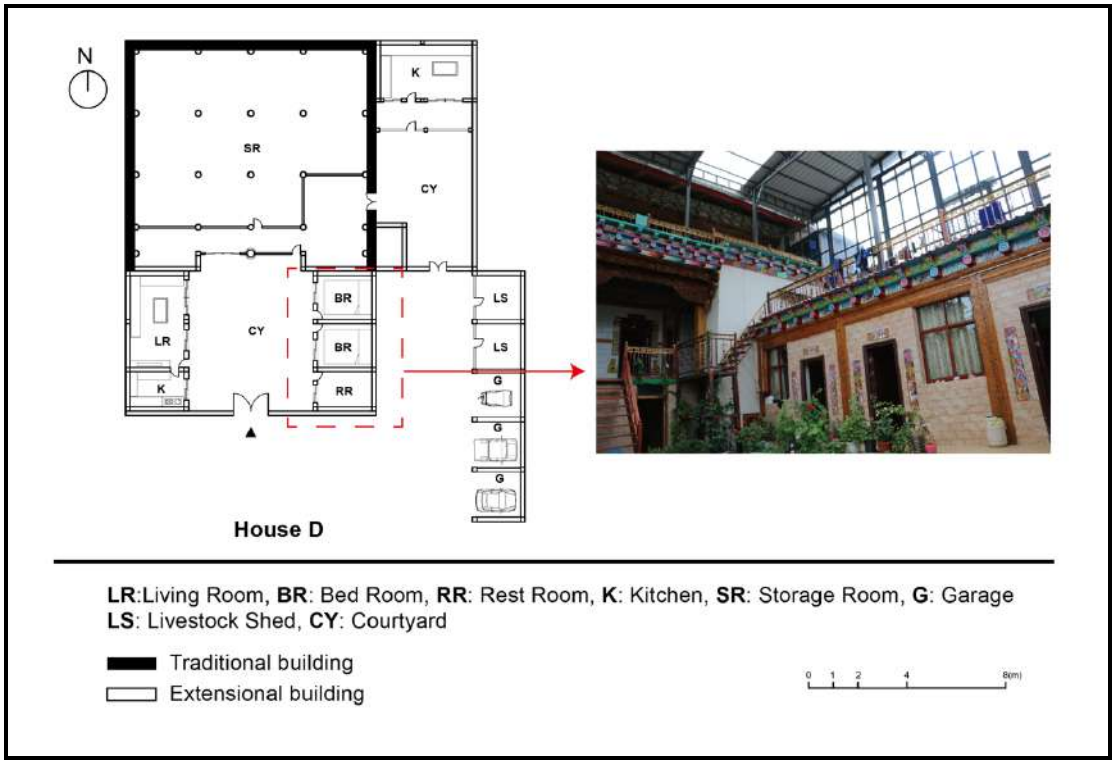


Figure 4- 8. Floor plans of Bungalows and traditional buildings[75]

As shown in the planning maps, the attached bungalow is a complete architectural sequence space that combines a kitchen, bedroom, living room, toilet, and other basic living facilities. According to the survey results, the villagers have moved their daily life to the annex structure, while they only used the living room in the main house on commemorative days. It represents the living space of a traditional house gradually losing its practical function, but the attached bungalow gradually gathers track of daily activities. The above phenomenon is thought to have been caused by the following two leading causes.

① The lack of essential functions of traditional Tibetan Houses, taking Dwellings A, B, and C as examples.

A frigid natural environment in the Diqing plateau area makes Shangri-La residents demand high thermal performance from their houses. Tibetan houses in Jidi village traditionally have a large dining area and only one stove for heating, which makes maintaining a comfortable temperature difficult. Furthermore, specially designed small windows that sustain the house's warm temperature contribute to poor household lighting. The final problem is that there are no toilets in traditional houses, which is a significant inconvenience in everyday life. Externally attached toilets depicted in drawings are used mainly by people enrolling in Buddhist temples. Traditional Tibetan houses in Jidi village were not equipped to accommodate essential routine requirements because of the problems described above. As a means of self-innovation, the villagers spontaneously designed and built ancillary bungalows to compensate for the bother of traditional living space. Besides the dining room, old dwellings A, B, and C bedrooms have also begun to move out. The four houses converted their living spaces into newly built modern houses, preserving only sacred and storage areas in their traditional buildings. Residents have access to the Buddhist Hall every morning for praying and chanting sutras. Nevertheless, the

[75] Drawn by the author. Photo took by the author.

frequency of utilization of living space in the traditional house has declined sharply because the space will be used only during the Tibetan New Year, special holidays, the visiting of guests, weddings, funerals, or any other essential activities.

② Changes in the financial industry, taking dwelling D as an example.

The traditional Tibetan building in House D is a rebuilt new structure with the construction of toilets, water taps, and other improvement measures that can fully meet life's basic needs. However, residents' daily activities are still primarily concentrated in the attached bungalow. A significant factor contributing to this was the change in the household income system. Farming and animal husbandry were the primary sources of income for family D in the past. With the development of Shangri-La's tourism industry, the Matsutake trading system in Jidi village expanded and became the primary source of income for the villagers. Matsutake income can support a family's expenses for an entire year. Currently, all the family members of House D would climb the mountain to collect Matsutake during the rainy season, starting from July to September every year. There was often mud all over the body during this period, preventing residents from keeping their houses neat and clean. Considering the purity and holiness of the traditional new house, the family members of House D still choose to carry out daily life in the attached structure freely. Residents still go to the Buddhist Hall for blessing every morning after they clean themselves up. The prominent Tibetan building in residential house D has become a more solemn area than the attached bungalow. Ultimately, accessory structures' convenience increases people's reliance on them.

The inhabited space of traditional Tibetan buildings has undergone a subtle transformation in particular usages. Residents' activities moved to the attached modern structure, while the storage space and sacred space remain in the traditional buildings. Compared with the auxiliary structures built and used freely, traditional houses have absolute holiness because of the existence of sacred space. Tibetan culture is highly inherited and affects residents' utilization of buildings.

5) The evolution of residential structures

Interviewing every householder confirmed the change history of the four houses, as drawing records were absent for these residences. Hose D has no evolutionary history due to it was constructed five years ago on the foundation of a traditional Tibetan house that had already been demolished. The development process for Houses A, B, and C follows a standard pattern where each house progresses through three stages: one traditional building, one traditional building with a courtyard, and one traditional building with a courtyard and annex buildings. Residence B is employed as an example, and the evolution is graphically reconstructed, as depicted in Figure 4-9. The investigation revealed that the evolution of dwellings prompted a change in construction workers, which will be discussed in the following section.

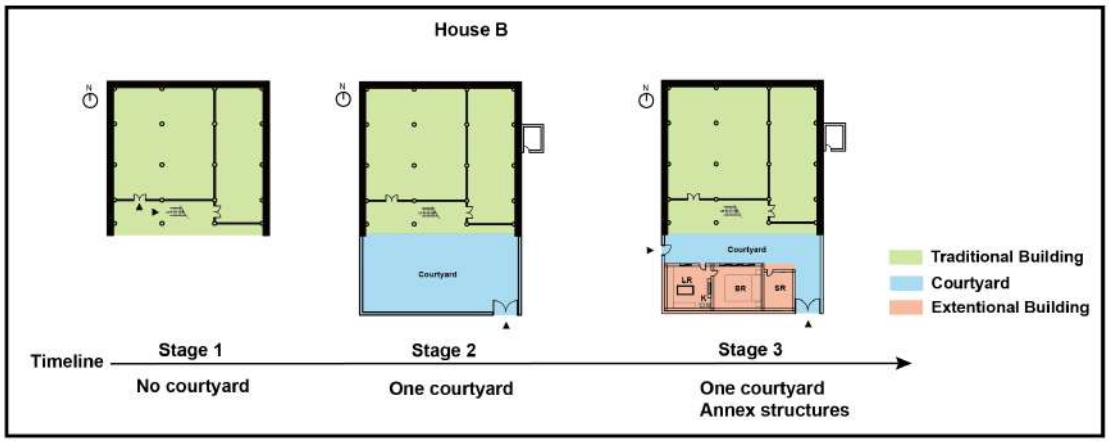


Figure 4- 9. The evolution of House B[76]

6) The evolution of construction workers

For the construction methods of traditional buildings, House A is one of the oldest dwellings constructed using a traditional process by local artisans from Jidi Village. However, House D is the newest one constructed by ethnic Han workers from Heqing County[77] (a county within Dali city) and Bai minorities[78] from Jianchuan County[79] (a county within Dali city). The attached structure of House C was also built by the ethnic Han and curved by the ethnic Bai.

Table 4- 3. The evolution of construction workers.

No.	Traditional Main Building	Affiliated modern structure
House A	Yuphel[80]	Yuphel
House B	Yuphel	Yuphel
House C	Yuphel	Han and Bai artisans
House D	Han and Bai artisans	Han and Bai artisans

The change in construction methods also reflects the changing role of Tibetans in the construction process. The system of mutual labor assistance among villagers in rural Shangri-La was referred to as “Yuphel,” similar to the Japanese Yui system, where households exchanged labor to accomplish tasks such as constructing dwellings. Close to two decades ago, in Jidi Village, the construction of residential houses predominantly relied on Yuphel within the village. Under this system, each family contributed one or more members as laborers to participate in the construction of another family’s house. These Yuphel carried out the construction work by adhering to a classical inheritance model from ancient times. All the residents of Jidi Village are members of the Yuphel organization, and the only way to build residential houses is with the assistance of Yuphel.

However, the influx of Bai and Han artisans completely transformed this construction system.

[76] Drawn by the author.
[77] Heqing County is located in the northern region of Dali Bai Autonomous Prefecture, Yunnan Province. It is home to six coexisting ethnic groups: Bai, Yi, Han, Lisu, Miao, and Zhuang, the dominant ethnic group in the county.
[7] Ethnic Bai (Baizu, 白族) is a minority nationality with a long history and culture in southwest China. Mainly distributed in Yunnan, Guizhou, and Hunan provinces, among which the Bai nationality in Yunnan Province has the largest population, mainly living in Dali Bai Autonomous Prefecture in Yunnan Province.
[79] Jianchuan County is located in the northern edge of Dali Bai Autonomous Prefecture, Yunnan Province. It is situated at the junction of Dali (ethnic Bai), Lijiang (ethinc Naxi), Diqing (Tibetan), and Nujiang (ethinc Nu), and the predominant ethnic group is the Bai people.
[80] Yuphel, Tibetan traditional artisans.

These craftsmen are mainly from the Bai ethnic group of Jianchuan, the city of Dali, and the ethnic Han group of Heqing, another city of Dali. They currently represent most of the construction worker's market in Shangri-La due to their high craftsmanship and relatively reasonable prices. Residents in Jidi village started employing these workers to build houses. Therefore, Tibetan people in Jidi village no longer participate in constructing Tibetan houses and have been transformed from builders into supervisor who only declare design specifications. However, we found Tibetan culture still plays a vital role in the construction process as a way of pledging dominance. The Buddha, specifically the Rinpoche of Tibetan Buddhist monasteries, should determine the layout of the Buddhist Hall and every ceremony date, including the construction date, completion date, and occupancy date for Tibetan residences in Jidi village.

Artisans from lowland ethnic groups integrated architectural elements from their respective cultures into Tibetan dwellings in Highland village using distinct techniques. As exemplified in Figure 4-10 [81], construction workers have transformed the structures and components of buildings in Jidi village, as evidenced by changes in the design and expressive form of the four residential doors. In recent years, the introduction of modern materials has led to a gradual shift in Jidi Village dwellings, with metal doors replacing traditional wooden ones. Notably, only traditional residential House A retains its wooden door.

Residences B and C maintain the traditional wooden door frame but adopt contemporary metal doors. Conversely, Residence D's door exhibits a more modern and intricate composition in both material and design. By combining traditional Tibetan wood carvings with conventional Bai door heads, Bai artisans have created a new gate style for House D. Noteworthy is the upturned portion of the gatehouse eaves, absent in typical Tibetan dwellings but bearing a remarkable resemblance to ethnic Bai door features. Additionally, House D's door jamb aligns more closely with Bai stylistic conventions. The popularity of this modern door design among villagers is evident, as the imposing gate head serves as a symbolic representation of a family's economic and social standing.

[81] Drawn & designed by the author. All the pictures depicting Tibetan dwellings were captured by the author in 2020 and 2023 while conducting on-site field research. The photos of ethnic Bai dwellings were taken by Lingchen Kong in 2023.

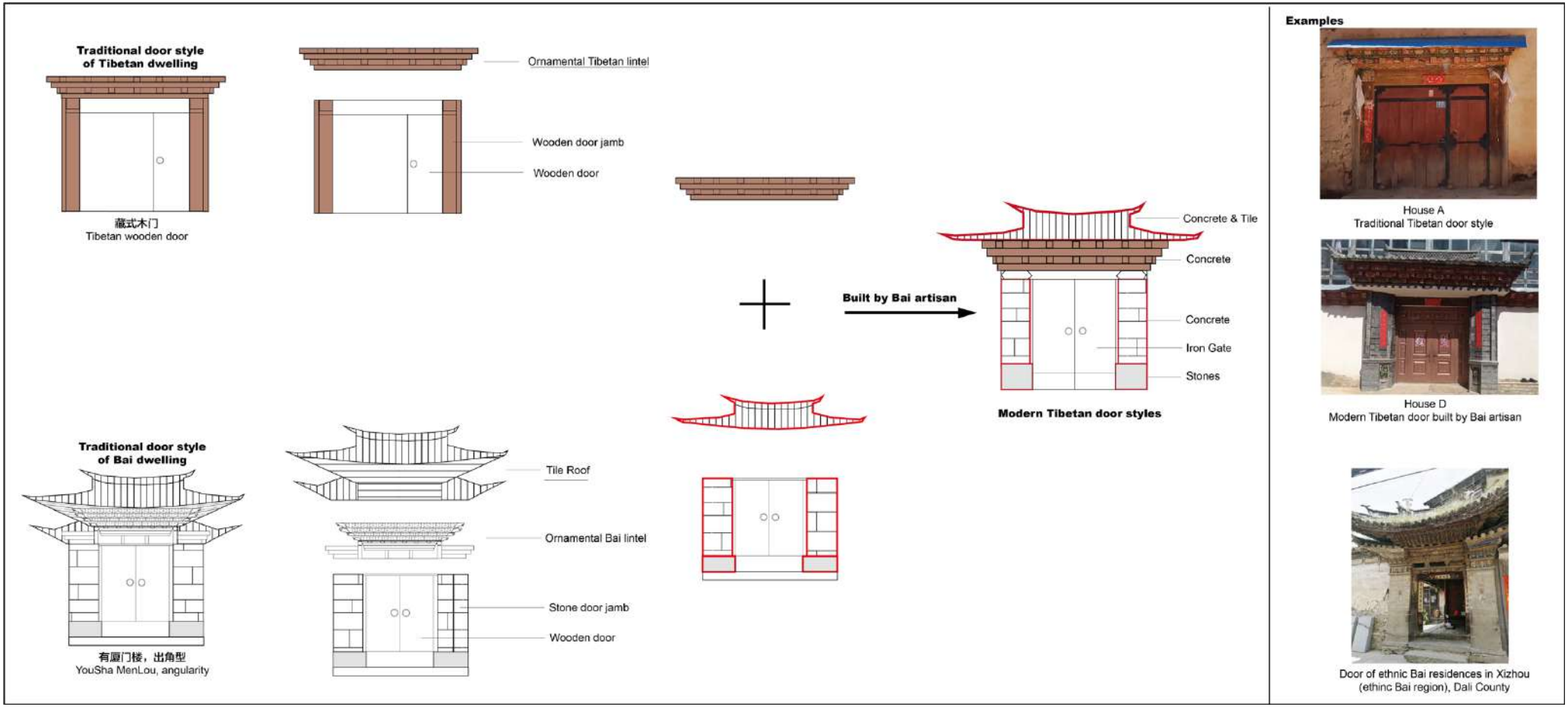


Figure 4- 10. Evolution of modern Tibetan door styles influenced by Bai artisans

4.3.5 Discussion

Following the above analysis, modern Tibetan dwellings in Jidi Village exhibit variations in overall floor plans, three-dimensional spaces, construction materials, and construction workers. These changes result from the villagers' automatic adjustment to the inconvenient living environment of traditional buildings and multi-ethnic cultural effects in Shangri-La. The results triggered our thinking about the evolution of Tibetan dwellings in Shangri-La and the potential influence of other ethnic minority dwellings. This chapter intend to interpret the development of Tibetan dwellings in the Shangri-La area in recent years and estimate the potential influences from other ethnic groups by using the survey data of Jidi Village.

1) The revolution of Tibetan dwellings in Shangri-La during the past decades

Scholars have surveyed and mapped the residential buildings in the Shangri-La area, but most of them only focused on the main traditional structure. With ten years as a benchmark unit, we selected representative works that mapped the overall layout of residential buildings to summarize the evolution trend of Tibetan residential buildings in the Shangri-La area. The earliest records written by Duan Shouzi show that the Tibetan residence in Shangri-La consisted of a single house without any courtyard (Duan, 1986) [14]. However, in Jiang's 1997 drawing, a simple courtyard with a small house built on one side of it appeared in the Tibetan residence (Jiang, 1997) [15]. Zhai Hui's drawing, published in 2008, illustrated that one or two sides of the front courtyard had built soil palm houses for kitchen or storage space (Zhai ,2008) [16]. According to the horizontal section maps in this research, the original single courtyard in front of the traditional house has enlarged into a spacious area where attached houses and courtyards coexist.

Figure 4- 11. Floor plans of Shangri-La's Tibetan dwellings during the past decades

The above graph[82] illustrates that the level plan of Tibetan folk houses in Shangri-La is becoming more diverse in recent years. The front courtyard space has undergone four stages: no courtyard, a simple courtyard, a courtyard with a preliminary bungalow, and a courtyard with a complete auxiliary structure. This evolution is consistent with the changing state of the layout described by the owners of the four residential houses in Jidi Village. Remarkably, the entire auxiliary structure makes the current floor plan of the Tibetan people's residence reflect a courtyard style(合院式) similar to the Bai traditional residences rather than Tibetan. To support this view, we conducted a comparative analysis on the level plan of modern Tibetan and Bai folk dwellings.

2) The integration of ethnic Bai cultures in the Shangri-La's Tibetan community

Three houses with one front wall (三坊一照壁) refer to the courtyard style (合院式) of a traditional Bai folk house in Dali. It is embodied as a main room(主房) connected by two side wing-houses(厢房) on the floor plan. The modern Tibetan dwelling House D, whose constructors are Bai and Han workers from the Dali region, is highly similar to the traditional Bai residence on a floor plan. The attached structures on the east side of House D are not considered in the overall comparative plan as they are temporary structures used by the family during the Matsutake season and will serve as livestock sheds in the future. Regarding the traditional Tibetan structure of House D as the main room of the traditional Bai house, the attached structures on both sides of Hosue D are equivalent to the wing room, as displayed in figure 4-12. Furthermore, there is also a similarity in the primary and secondary grades between the two residential houses. The bedrooms in the main house of the Bai folk dwellings are designed for elders, while the wing room is for the younger generation. Similarly, the traditional Tibetan structure is regarded as a more critical space in daily life because of its sacred space, and the attached structure is relatively free and random.

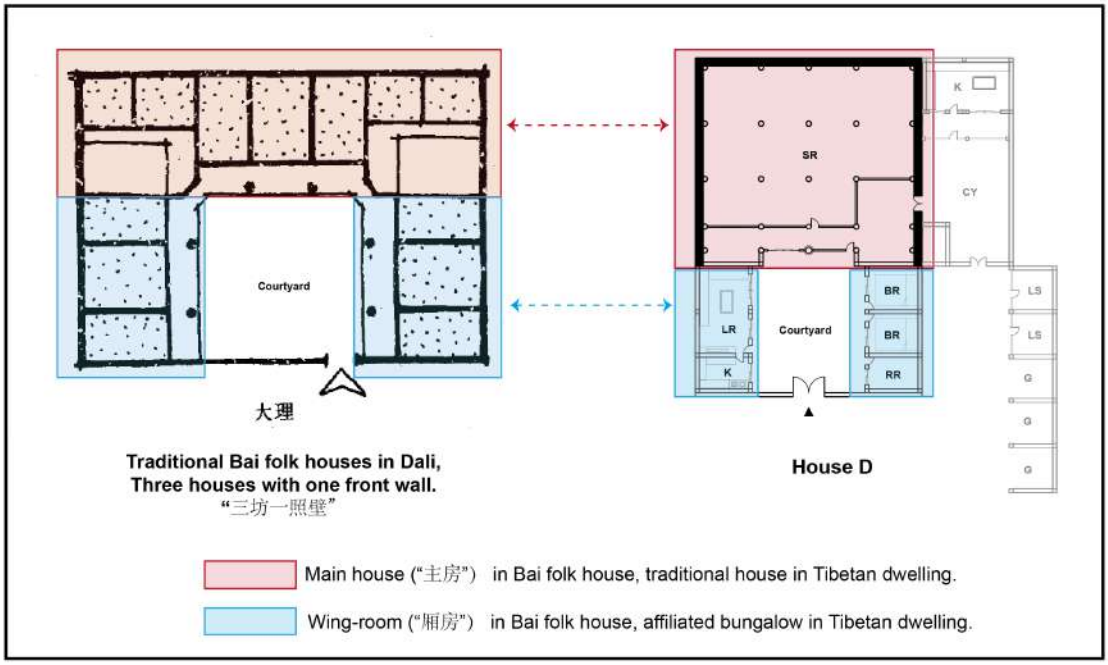


Figure 4- 12. The comparison between Bai folk houses and modern Tibetan dwelling[83]

[82] Jiang's drawing is referred to "Yunnan ethnic housing culture", published in 1997, p. 284. Yunnan University Press. Zhai's drawing is cited from "Yunnan Tibetan House", published in 2008, p. 36. Yunnan Science and Technology Press.
[83] The drawing of Bai folk house is cited from "Yunnan Design Institute editorial group of Yunnan Folk Houses", published in

In addition to the design of the door head discussed before, this combination of layout is another feature of integrating ethnic Bai's architectural cultures into modern Tibetan dwellings. As an intermediary, the Bai workers contributed their skills and design concepts to Shangri-La Tibetan residences and facilitated multicultural integration successfully. The adjustment of artisans also raises the question of why Bai artisans from Dali City in the south can effortlessly enter Shangri-La to work. A major reason for this is the improved infrastructure of Diqing built by the Han people over the past decades. Improving transportation by the Han people provided a good platform for communication between Tibetan people and ethnic Bai groups. The specific influence of the ethnic Han will be discussed below.

3) The alternation aroused by the ethnic Han on Shangri-La's Tibetan dwellings

In the past decades, the Diqing government has increased the construction of basic infrastructure, including the completion of air, land, and water transportation networks around 2000[84] and the expansion of high-speed rail in a few years[85]. Transportation improvement enables the various ethnic groups around Diqing to communicate more harmoniously. Construction artisans from other regions can more easily enter Shangri-La for technical construction exchanges. Aside from the various architectural labors, modern building materials were also introduced to Shangri-La. The building materials and the structure type of Shangri-La's Tibetan dwellings also evolved along with the ususage of modern materials. The traditional Tibetan residence is a civil structure built with traditional materials such as sun-dried mudbrick, wood, and stones. However, the attached buildings are mostly frame structures made of modern materials containing brick, steel, and concrete, as displayed in Figure 4-13.

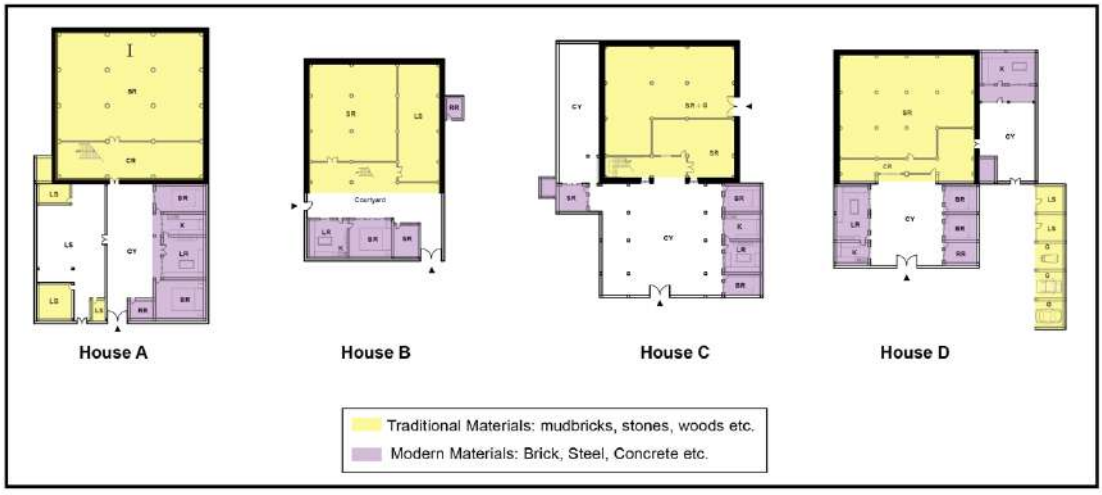


Figure 4- 13. The building materials of four Tibetan dwellings [86]

New materials construct all the auxiliary structures in the study case. In conjunction with the analysis of plane evolution, it can be inferred that changes in building materials contributed indirectly to the formation of the Shangri-La's Tibetan courtyard style. As a result of the above

1986, p. 33. China Architecture and Building Press.
[84] Referred to the "Shangri-la County Annals, 1978-2005". Compiled by Shangri-La Local Chronicles Compilation Committee. Kunming, Yunnan People's Publishing House, 2016. P587-596.
[85] According to the "Report on the work of the Diqing Government from 2005 to 2021".
[86] Drawn by the author.

analysis, it can be concluded that the architectural influence of the ethnic Bai on Tibetan dwellings in Shangri-La and the transformation of building materials can be attributed to the construction of infrastructure by the Han. From this point of view, the Han also plays a critical driving role in the evolution of Shangri-La's Tibetan settlements.

4) Conflicts: The dominant role of Tibetan culture in residential houses within the evolution process

The evolution of Tibetan dwellings in Jidi Village shows that the architectural influences brought by the Han and Bai ethnic groups are visible primarily on the surface of the buildings. However, Tibetan culture still dominates the interiors of Tibetan dwellings in the Shangri-La region. Despite how multi-ethnic cultures are integrated, villagers can still identify the social and cultural significances behind Tibetan dwellings based on the size and decoration of the buildings. Villagers can read the relationship between one family and the temple by observing the height of the building, evaluate the social level of one family by the decoration of the Chura, Thabka, and Barka, and estimate the Buddhist status of family members through the degree of the luxurious design of the Buddhist Hall. Moreover, even the door built by Bai artisans gradually joined the symbolic system that the complexity represents the economic status. Architecture has become a carrier of Tibetan culture in these processes. Sacred space is a Tibetan residence's most frequently used and critical area. It is precisely because of the existence of the Buddhist Hall that traditional Tibetan architecture has more sacred significance than the attached modern-Tibetan architecture so that the villagers have absolute awe and protection of traditional Tibetan architecture. Although multi-ethnic cultures have been integrated into the dwellings, Tibetan culture and beliefs are still absolute dominants in the dwellings of Tibetan.

5) The essence of interactions between lowland and highland settlements in architectural changes

The above content analyzes the impact of modern architectural materials on traditional Tibetan dwellings in highland settlements. Simultaneously, it demonstrates that after craftsmen from lowland settlements enter highland areas, the primary architectural style transforms from standalone structures to courtyard-style. In recent years, this phenomenon has been commonly labeled "modernization" in the fields of research pertaining to Chinese minorities. However, "modernization" is a term that describes the unified concept of this phenomenon rather than its essence. The label "modernization" makes it impossible to understand the nature of the changes discussed in this chapter, as well as how to protect local cultures, such as those in highland regions. Consequently, it becomes imperative to reconsider the fundamental nature of the issue at hand.

In the scenarios outlined in this chapter, the predominant factor contributing to modernization is linked to the intimate interaction between highland and lowland settlements. Specifically, in the Shangri-La region, a significant junction on the Ancient Tea Horse Road, deeply exchanges occurred between the Bai and Naxi ethnic groups and Tibetans. Interactions between diverse ethnic groups are not new; they were prevalent when Tea Horse Road was founded, fostering interaction between them. The Ancient Tea Horse Road, however, did not contribute to the significant changes observed in the highland world today as a result of exchanges between highland and lowland regions. As a result, it is necessary to analyze the differences between the communication patterns resulting from the Ancient Tea Horse Road and those arising from modern transportation systems. The main distinctions lie in the transport medium, transported goods, and transportation efficiency as shown in the following table (Table 4-4).

Table 4- 4 The distinction between traditional and modern trading structures

----------	Transport medium	Transport content	Transport efficiency
The Ancient Tea Horse Road Pattern	People, horses, mules	Necessary for life: Tea, Salt, Rice, Clothes etc.	Dali (ethnic Bai region) – Lijiang (ethnic Naxi region) – Shangri-La (Tibetan region), spent around half a month.
Modern Transportation Pattern	Modern vehicles, including trucks, airplanes, and cars.	Necessities and non-necessities.	Same route within one day.

During the Ancient Tea Horse Road era, exchanges were limited to small-scale interactions involving necessary goods for living hood. Building materials like reinforced concrete and glass were challenging to transport using human and horse methods. With the advent of cars and the establishment of highways in the 1970s, the Tea Horse Road gradually faded from historical significance. Goods, and materials could be easily transported to highland settlements. At this point, the scale and nature of interactions between lowland and highland areas had expanded and undergone a complete transformation. With their construction skills and the use of modern materials, builders from the lowlands were able to easily influence or alter the architecture of the highlands.

Furthermore, traditional Tibetan dwellings pose numerous inconveniences to living conditions. The convenience, affordability, and speed of construction facilitated by skilled craftsmen from lowland areas make it the preferred choice for highland Tibetan residents. Therefore, the improvement and convenience of modern transportation systems have facilitated the entry of lowland civilizations and technologically simple and fast methods into the highlands. Transportation is one of the most critical factors in modernizing traditional dwellings. Through this analysis, the answer has become evident. The development of modern transportation, leveraging its convenience, timeliness, and ease of mobility, is rapidly transforming highland settlements of ethnic minorities—all the observable changes analyzed above stem from this factor.

4.3.6 Discussion

Based on the current modernization problems of Tibetan folk houses in Shangri-La, this study explores the influence of multi-ethnic culture on Shangri-La's Tibetan dwellings by taking the Jidi village as an example. Following fieldwork, level plans, section maps, and interviews were used to conduct the research. The changes of Shangri-La's modern Tibetan dwellings on the overall layout, construction workers, and building materials were revealed. Moreover, the evolution of Shangri-La's Tibetan dwellings in the past decades to reveal the modernization process by citing the planar data from other studies has been sorted.

The results showed that the hierarchical system of Tibetan Buddhism profoundly affects the scale, spatial layout, and traditional components of Shangri-La's Tibetan traditional dwellings. Modern Tibetan residences in Shangri-La have gradually established auxiliary structures attached to the traditional structure and presented a courtyard style. The study highlighted the influence of ethnic Han in the choice of construction materials and the contribution of ethnic Bai artisans in shaping architectural styles, as evidenced by examining the historical evolution of architecture in Jidi Village.

Alterations in the invisible village building systems have instigated various observable changes in Tibetan residential architectural styles. The appearance of craftsmen from other ethnic minorities has also triggered mobility between the Shangri-La Tibetan region and other areas. However, such mobility has been based on the recent improvement and enhancement of the transportation system

in the Shangri-La region. Transportation improvements have allowed architectural techniques to be exchanged across different regions. In contrast, actual changes in residential construction have made Tibetan rural construction more urbanized than ever before. This urbanization in Jidi village is essentially a product of village communication. The improvement of the transportation system, as Wajiro Kon pointed out, is a contributing factor rather than the sole outcome.

4.4 Conclusion

The research in the Japanese section illustrates how village organizations such as Yui have expanded gassho-style houses within the highlands of the Shirakawa regions across geographical boundaries. In contrast, the research in the Chinese section showcases how both Bai and Han artisans in the lowland brought their construction skills into the Shangri-La Tibetan highland region with the development of the transportation system. One involves the expansion of architectural styles within highland settlements a century ago. In contrast, the other involves the arrival and spread of architectural styles and materials from the lowland world to the highland world, occurring with rapid economic development in recent years.

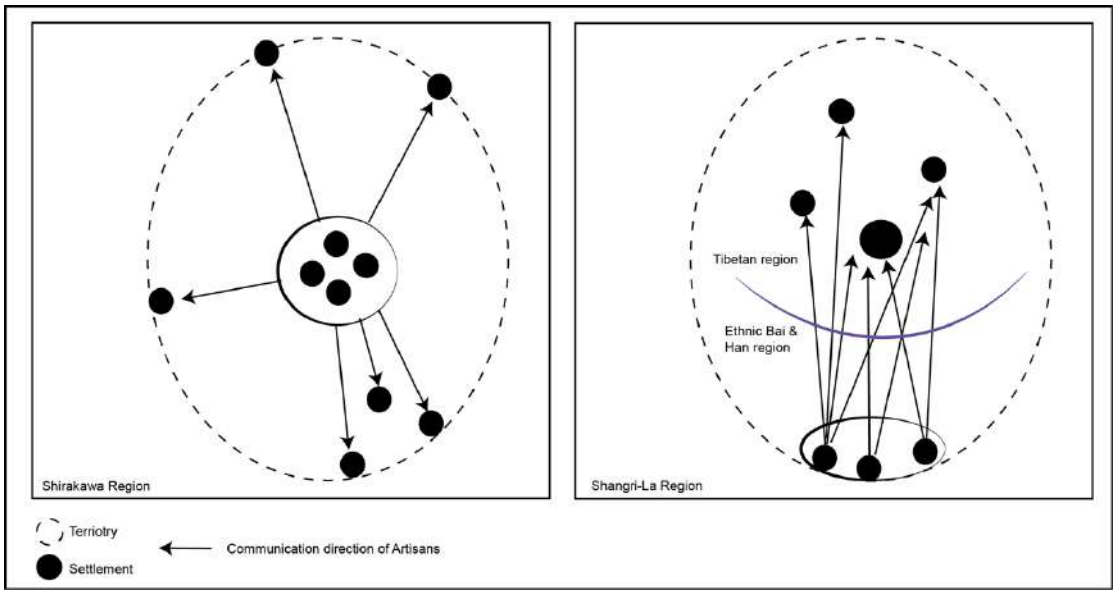


Figure 4- 14. The village communication network diagram between highland and lowland villages[87]

This chapter illustrates those highland settlements, in addition to their essential economic material needs, retain connections with the lowland world, particularly in technical skills like residential construction. Compared to the mobility driven by economic material exchange presented in Chapters Two and Three, this form of exchange facilitated by individual craftsmen may appear somewhat concealed. However, as mentioned in Chapter One, the highland world is not an isolated entity; its openness and connectivity with the lowland world vary according to transportation accessibility.

Besides, transportation has improved the convenience of travel for highland residents, but it has also brought about a variety of impacts and contradictions. In particular, this contradiction can be seen in the fact that, on the one hand, highland residents expect modern construction techniques and materials to address the inconveniences and lack of advancement in their original dwellings.

[87] Drawn by the author. Referred to the Figure 1-8 & 1-9 in Chapter 1.

Once the living environment has been upgraded, they strongly emphasize the dominant position of their local culture, such as enhancing the sacred status or priority of traditional Tibetan dwellings. Highland residents enthusiastically adopt innovations in lowland technology but also harbor concerns about the potential erosion of their indigenous culture. This observation stands out as the most significant in this section.

4.5 References

1) 今和次郎. (1922). 日本の民家 : 田園生活者の住家. 鈴木書店.
2) 今和次郎. (1971). 今和次郎集 第2巻 民家論. ドメス出版.
3) 稲垣栄三,伊藤鄭爾,田中稔,大河直躬. 民家研究の成果と課題. 建築史研究, 第21号、22号.
4) 瀝青会著. (2012). 今和次郎「日本の民家」再訪. 平凡社.
5) 中谷礼仁, 清水重敦, 石川初, 御船達雄, 福島加津也, & 菊地暁. (2011). 今和次郎著 『日本の民家』(1922) 所収の民家再訪調査 「無名」 の民家を基準とした日本の居住空間・景観の変容分析. 住宅総合研究財団研究論文集, 37, 97-108.
6) 稲垣栄三. (1952). 山村住居の成立根拠-1. *建築史研究/建築史研究会 編*, (10), 1-14.
Inagaki Eizo. (1952). Formation Basis of Mountain Village Dwellings - 1. Journal of Architectural History, (10), 1-14.
7) 稲垣栄三. (1953). 山村住居の成立根拠-2. *建築史研究/建築史研究会 編*, (12), 20-29.
Inagaki Eizo. (1953). Formation Basis of Mountain Village Dwellings - 2. Journal of Architectural History, (12), 20-29.
8) 稲垣栄三. (1954). 山村住居の成立根拠-3 完. *建築史研究/建築史研究会 編*, (15), 11-23.
(1954). Formation Basis of Mountain Village Dwellings - 3 Complete. Journal of Architectural History, (15), 11-23.
9) Yamamoto, N. (2019). The World of Tropical Highlands. Japan: Nakanishiya Press.
10) Xu, Z. (2004). An introduction to Tibetan traditional architecture. China Architecture & Building Press.
11) He, Q. (2009). Research on Architectural Culture of Tibetan Vernacular Housings. PhD Dissertation, 110-122.
12) Wang, Z. (2006). The Social and Cultural Background Analysis of the Tibetan Residence at the Northeast of Shangri-la: Investigation of Wongshui Village, Gezan Country, Shangri-la. Architecture History, Vol. 24: 170-173.
13) Yu, L. (2019). Study on the Blending of National Culture in the Painted Decoration of Tibetan Dwellings. In 3rd International Conference on Art Studies: Science, Experience, Education. Atlantis Press, 303-307.
14) Duan, S. (1939). Annals of Zhongdian County. Intergration of Chinese Local Chroicles.83.
15) Jiang, C. (1997). Yunnan ethnic housing culture. Yunnan, Kunming: Yunnan University Press.
16) Zhai, H.,Bai, W., and Wang, L. (2008). Yunnan Tibetan House. Yunnan Science and Technology Press.
17) Taniuchi, M., and Shiotani, T. (2011). A Study on the Spatial Concept of Tibetan People as Defined by their way of Spatial Recognition and Behavior in their Dwelling Life: In the case of Pooh-lei village in Shangri-La (Zhongdian) prefecture, Yunnan, China. J.Archit. Plan. AIJ vol 76, 667: 1585-1592.

18) Shan, J. and Wu, Y. (2013). Study on the Eco Low-tech Strategy of Tibetan Dwellings in Yunnan. South Architecture. Vol. 3: 4-7.
19) Ewing, S. (2003). Traditions of Appearance: Adaptation and Change in Eastern Tibetan Dwellings. Traditional Dwellings and Settlements Review, 73-84.
20) Dong, J., and Jin, H. (2013). The design strategy of green rural housing of Tibetan areas in Yunnan, China. Renewable energy, 49, 63-67.
21) Zhao, Z. (2020). Study on the characteristics of the cultural elements of Tibetan dwellings in Shangri-La. Master's thesis, Beijing University of civil engineering and Architecture.

Chapter 5. 本論・考察・Discussion: The characteristic and essence of traditional Highland villages

5.1 What are the features of a traditional Highland settlement? ・伝統的高地集落の性格は何ですか？

5.2 What are the livelihoods of a traditional Highland settlement? ・伝統的高地集落の生活環境と運営方法は何ですか？

5.3 What is the essence of a traditional Highland settlement? ・伝統的高地集落の本質は何ですか？

5.4 Predictions and Suggestions・予測と提案

5.5 Summary・まとめ

5.6 References・参考文献

Chapter 5　本論　考察・Discussion: The characteristic and essence of traditional Highland villages

This chapter is an examination based on all the analytical content up to the present. This study has first underscored the frequently overlooked aspect of the "distribtuion" linked to highland settlements, achieved through a thorough examination of global literature. Grounded in Territori research within architectural history, the study further concentrates on a specific river basin to discern the relativity inherent in highland settlements. It analyzes the settlement structure, communication methods, and technical exchanges among residential artisans in highland and lowland settlements within the research scope, using sectional diagrams and settlement analysis cards. By acknowledging the elevation differences of highland settlements, this research argues against an exclusive reliance on absolute elevation for understanding them. The findings indicate that highland settlements possess additional concealed features beyond their absolute elevation. Revisiting the three questions posed in the initial chapter, the objective of this study is to provide clarity.

- *What are the features of a traditional Highland settlement?*
- *What are the livelihoods of a traditional Highland settlement?*
- *What is the essence of a traditional Highland settlement?*

The answers to these three questions are scattered throughout the preceding chapters, and this chapter synthesizes and summarizes these answers to address the questions. Meanwhile, some unique features of the living environment of highland settlements, especially in the Shangri-La region, discovered during practical research, will also be discussed in this chapter.

5.1 What are the features of a traditional Highland settlement?

A three-dimensional understanding of Highland settlement characteristics based on 3D sectional results.

The analysis presented in the first four chapters of this study and the summary of References materials indicate that the significant characteristic of highland settlements is their "isolation" from surrounding settlements. Over the past century, scholars have continuously investigated this isolation, primarily in geography. As an example, Japanese geographers proposed the concept of "Koukyo settlements" in 1930[88], and as early as 1921, French geographer Jean Brunhes proposed the theory of "islands." (Brunhes, 1921)[1)]. Brunhes's island theory encompasses a broad spectrum, comprising "mountain islands," "valley islands," "forest islands," and "sea islands." In his theory, the term "island" does not necessarily denote a geographical location surrounded by the sea on all sides; rather, it signifies areas with distinct and individual characteristics, resembling "small islands" within human society.

Highland settlements essentially embody the concept of a "mountain island," setting them apart from conventional lowland settlements. However, in prior research across disciplines such as geography, anthropology, and ethnology, planar methodologies have failed to express Highland settlements' "mountain island" characteristics. This study, leveraging architecture's unique spatial expression capabilities, attempts to depict the characteristics of "mountain islands" in highland settlements within a specific region by creating 3D cross-sectional diagrams. With the assistance of sectional drawings, transportation, settlement relationships, village structures, geological features,

[88] Refer to Keiji Tanaka's previous research in Chapter 2.

elevations, and other elements within a particular watershed area have been displayed comprehensively. In addition, it has been observed that both Chinese and Japanese highland settlements (Hongtu, Khamsegan, Ikurano and Tarumi) demonstrate the features of "mountain islands" owing to substantial variations in vertical elevation (Figure 5-1).

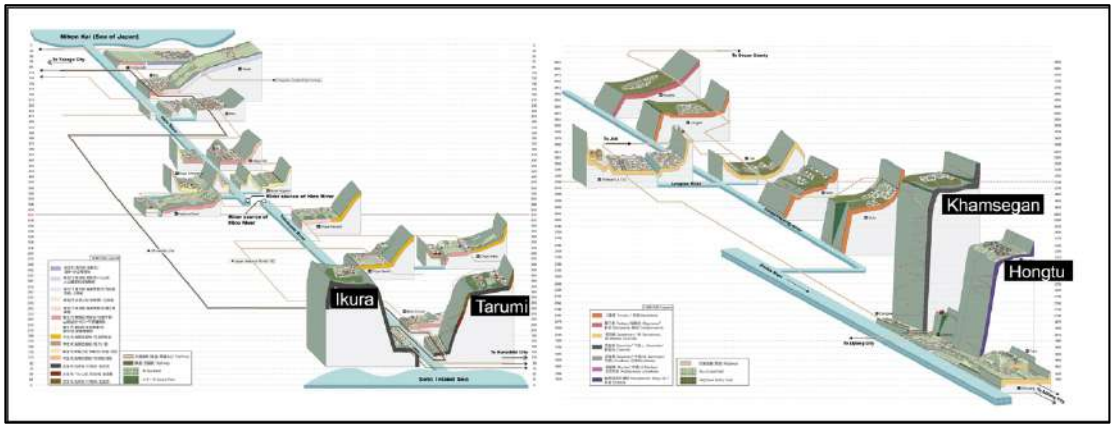


Figure 5- 1. Summary cross-sectional diagram of settlements in China and Japan[89]

In addition to demonstrating the 'isolation' between the highland and other settlements, the cross-sectional diagram confirms the following two points.

① Absolute high-altitude settlements ≠ Highland settlements.
If a high-altitude settlement is located in the gentle foothills between mountains and has a well-developed transportation system (i.e., higher accessibility), it exhibits the open style of lowland settlements. The economic development level of such settlements will also lead to the development of plateau basin-type cities similar to Shangri-La city.

② Vertical elevation differences: The fundamental element of highland settlements.
As opposed to the above, settlements with low absolute elevations but significant relative vertical elevation differences experience a sense of isolation, contributing to the mysterious characteristics of highland settlements.

5.2 What are the livelihoods of a traditional Highland settlement?

A discussion based on exploring the highland and lowland distribution pattern diagram.

This section aims to reconfirm that all the understanding regarding the "isolation" of highland settlements mentioned earlier is at the geographical level and pertains to the visible characteristics of highland settlements. Highland settlements have a distinct "internal character," a trait often overlooked—they are isolated in geo-vertical direction but not in their livelihoods. The villagers living in highland settlements autonomously overcome geographical "isolation" and have close exchanges with the economic centers in the lower settlements, as elaborated in chapters two and three.

Based on the summarized results of on-site investigations, this study separately depicts the patterns of exchange between highland settlements and their surrounding lowland settlements in the China and Japan section. The research findings reveal that highland settlements cleverly position themselves at the periphery of the economic service range of lowland trade settlements. At the same

[89] Figure 5-1 was drawn by the author.

time, they function as agricultural centers capable of providing goods to the surrounding economic circle. Their products, benefiting from unique geographical and climatic advantages, differ from traditional lowland rice products. Highland settlements in Japan section, for instance, produce Pione, which is known for its resistance to day-night temperature fluctuations. Highland settlements in China section specialize in the production of corn and high-altitude medicinal herbs, as shown in the following illustration.

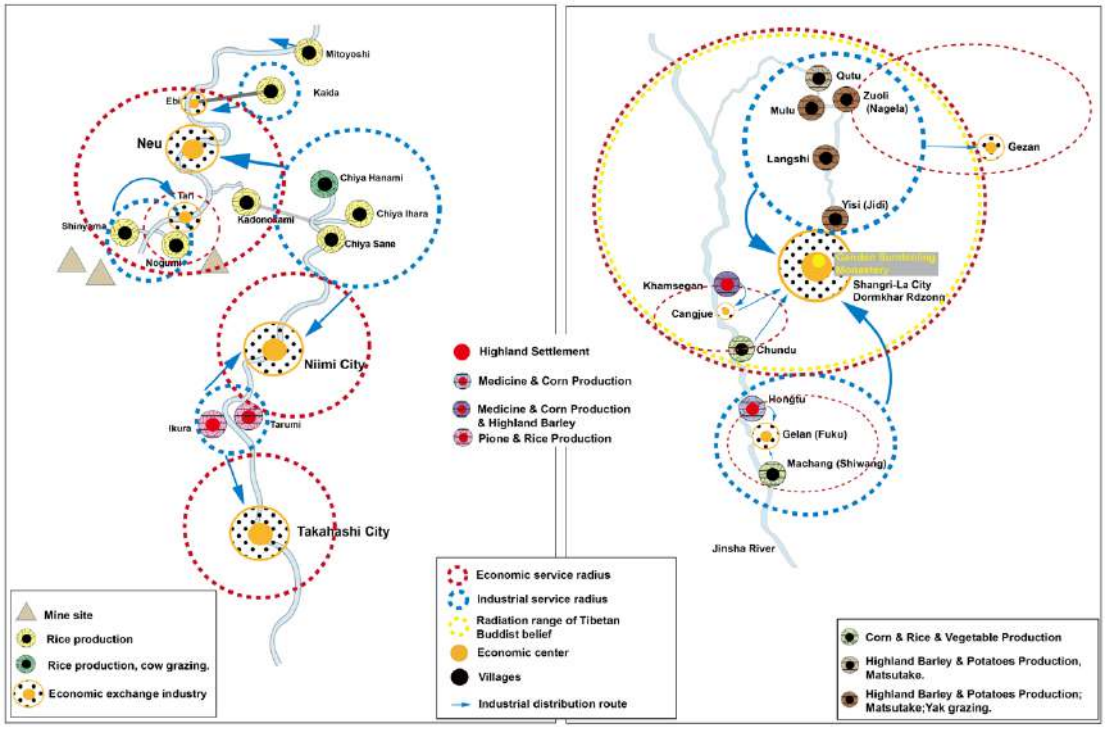


Figure 5- 2. Map of distributions between highland and lowland settlements in China (right side) and Japan (left side)[90]

It is critical to pay close attention to the inconspicuous distribution patterns of highland settlements to gain an understanding of their living patterns. There are two components to the livelihood of highland settlements: internal production circulation and external distribution of goods.

5.2.1 Internal Production Circulation of traditional Highland settlement

Scott proposed in Zomia that one of the main factors ensuring highland settlement stability was the existence of an internal agricultural cycle. Scott referred to this agricultural form as “evasive,” the crops cultivated under this form are called “evasive crops (逃避農業).” Specifically, residents of highland settlements need a type of crop adapted to high-altitude environments, resilient, fast-growing, and easy to conceal—helping them evade control from lowland inhabitants. Scott considers corn the most suitable evasive cereal because it can thrive in high-altitude steep, dry, and infertile environments where regular dry rice cannot grow. Corn’s adaptability to harsh conditions ensures that highland residents can survive in steep and difficult-access areas in a semi-settled form. The second category includes tuberous crops such as cassava and potatoes. These crops can be grown well in highland regions, are easy to cultivate and grow, and remain inconspicuous below ground, making them difficult to detect.

[90] Drawn by the author.

Although this evasive agricultural practice no longer exists in the modern world, Scott's analysis highlights the cyclical characteristics of production elements in highland settlement livelihood.

Highland residents ingeniously leverage the natural features of their settlements to cultivate crops adapted to the highland environment. Simultaneously, they also capitalize on the wealth of mountain resources, acquiring gifts from nature, such as mushrooms, medicinal materials, and animals, through hunting or gathering. Despite the relative shortcomings of highland settlements regarding accessibility and habitability compared to lowland settlements, the harsh natural environment provides unique conditions for the stable circulation of geological layer (the ground, 層 1 大地), agriculture (the shape, 層 2 かたち), and community（層 3 共同体）, thereby securing the internal livelihood of highland settlements (as shown in Figure 5-3).

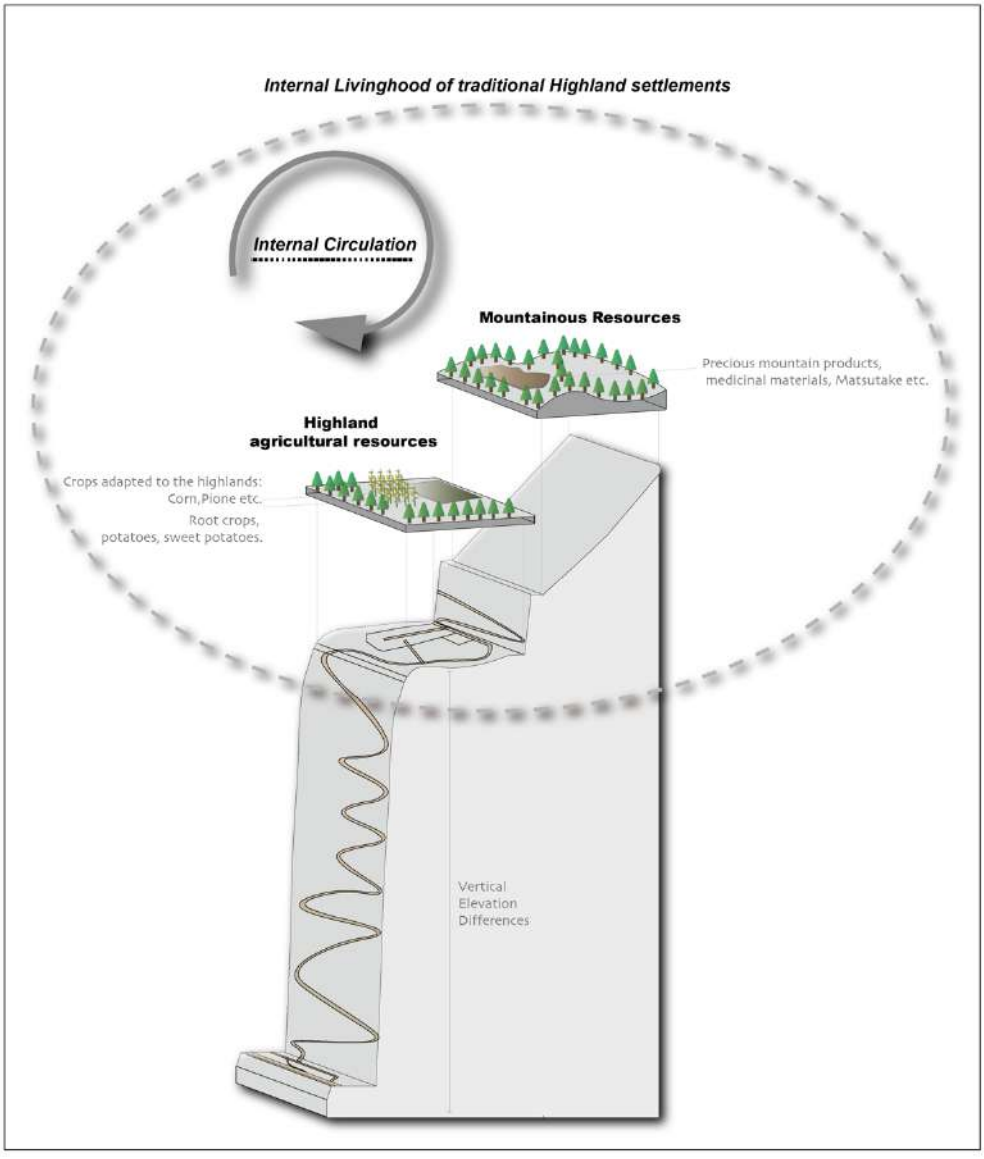


Figure 5- 3. Internal production circulation of a traditional Highland settlement

5.2.2 External Production Distribution of traditional Highland settlement

In addition to the stable internal production cycle of staple crops, external distributions are also a primary means by which Highland people sustain their livelihoods, as shown in Figure 5-2. Highland residents commonly cultivate, hunt, or gather valuable commodities for barter or sale in lowland markets, generating monetary income. They cleverly leverage the natural features of their settlements to cultivate crops distinct from those in lowland farming communities.

Besides, traditional Highland settlement residents predominantly achieve this trade exchange by overcoming vertical geographical distances. Simply put, traditional highland residents descend from the mountains to engage in trade below and then return to the mountains, whereas the lowland residents remain in lowlands exclusively. As a result, trade interactions between highland and lowland settlements are significantly shaped by the requirements of highland residents, granting them the autonomy to determine whether to participate in trade exchanges with their lowland counterparts. For instance, in Japan, highland residents in Tarumi or Ikurano proactively visit economic centers such as Niimi only when they need to purchase. Similarly, in China, highland residents descend only when they require goods. The exchanged goods predominantly consist of products abundant in the highlands that are lacking in the lowlands, such as medicinal herbs in Hongtu Village and Matsutake in Khamsegan.

Meanwhile, communication between highland and lowland areas extends beyond the economic realm. In Chapter Three, the study explains the unique beliefs associated with Tibetan Buddhism in the Shangri-La regions. During significant Tibetan Buddhist festivals, Tibetans from highland and lowland settlements converge at the cultural center Shangri-La (also an economic hub) for religious rituals. Cultural exchanges between highland and lowland settlements, linked by Tibetan Buddhism, emerge from these occasions. In Chapter Four's investigation of residential structures, it was discovered that there was a building technology exchange between artisans from lowland and highland settlements. In today's Shangri-La region, this exchange of construction workers remains prevalent. A more comprehensive understanding of the internal character of highland settlements, as discussed in this section, has been gained by examining cultural, economic, and architectural exchanges between highland and lowland settlements. The inner, invisible nature of the highland settlements, intricately connected to the lowlands, is a direct outcome of the strategic utilization of geographical "alienation" – specifically, an outwardly distinctive character – by the highland inhabitants.

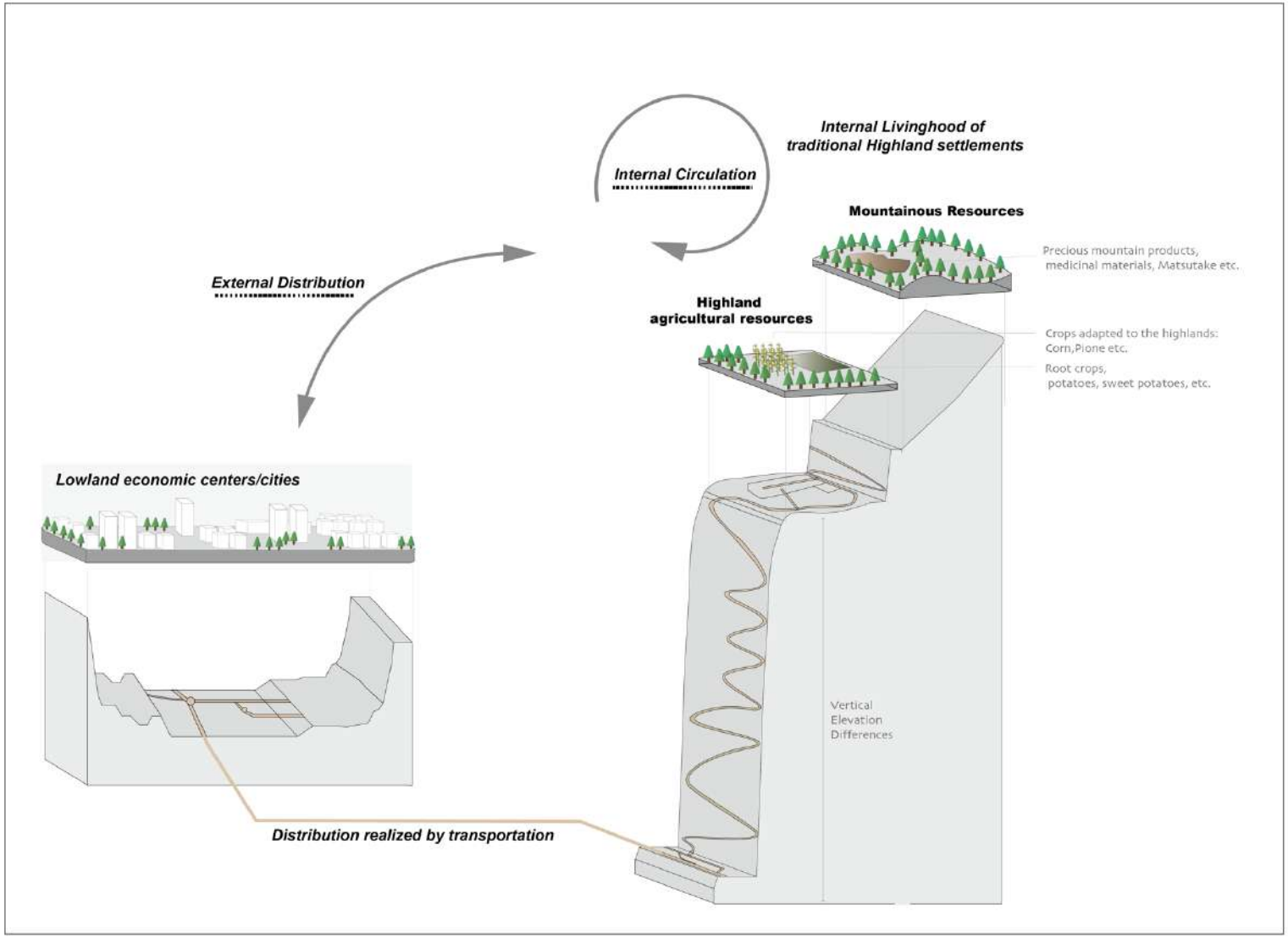


Figure 5- 4. External distribution between a traditional Highland settlement and a lowland economic center

In summary, the internal stable circulation and external distribution of goods in highland settlements are the two stable pillars supporting their livelihoods. The analysis of the two diagrams above shows that the residents may sustain the internal circulation internally, without external forces. However, external distribution cannot be conducted without the intervention of transportation elements. In other words, transportation serves as the foundational base to ensure the successful construction of these two stable pillars. From this logical perspective, transportation is the keystone element of highland settlements.

5.3 What is the essence of a traditional Highland settlement?

Geographical studies were the first discipline to recognize the importance of transportation to settlements. In the 18th century, German geographer J.G. Kohl pioneered the study of the "geography of transportation." (Kohl, 1841)[2] His fundamental idea was to realize that transportation and settlements are inseparable, or rather, settlements arise based on transportation systems. Based on Kohl's theory, Ratzel later proposed that transportation facilitates the flow of human ideas and materials across space (Ratzel, 1903)[3]. Kohl and Ratzel's theories continue to influence research in transportation geography today as an enlightenment (Yamaguchi, 1971)[4]. In the 20th century, more studies on the relationship between transportation and settlements were conducted. In settlement studies related to architectural and urban history, Territory in Europe explored the evolution of settlements and transportation. Millennium Village Research in Japan developed a significant methodology for transportation structures as one of the settlement-supporting elements (Nakatani, 2020)[5].

It should be noted, however, that scholars have yet to associate highland settlements with transportation structures. This indirectly contributed to the novelty of this study. The preceding sections, 5.1 and 5.2 of this chapter, have already unveiled the external characteristics of highland settlements, namely, the vertical elevation differences, and the internal characteristics, specifically, autonomous economic exchange with lowlands. Nevertheless, the above analysis has also identified a feature in highland settlements that is often overlooked in studies but is crucial to understanding them: inaccessible transportation.

The transportation systems of highland village in this research, whether in Tarumi, Ikurano, Hongtu, or Khamsegan, are all difficult to access and winding (Figure 5-5). The steep and winding paths often require considerable time to traverse. As a result, highland villagers are more adept at winding mountain roads than outsiders. Mountain roads are winding and narrow, creating barriers between highland and lowland villages. A vast mountainous plain unfolds upon reaching the highland settlement via an inconvenient transportation system. The meandering roads, mountainous plains, and the surrounding forests collectively shape the distinctive landscape space of the highland settlement (as depicted in the illustration).

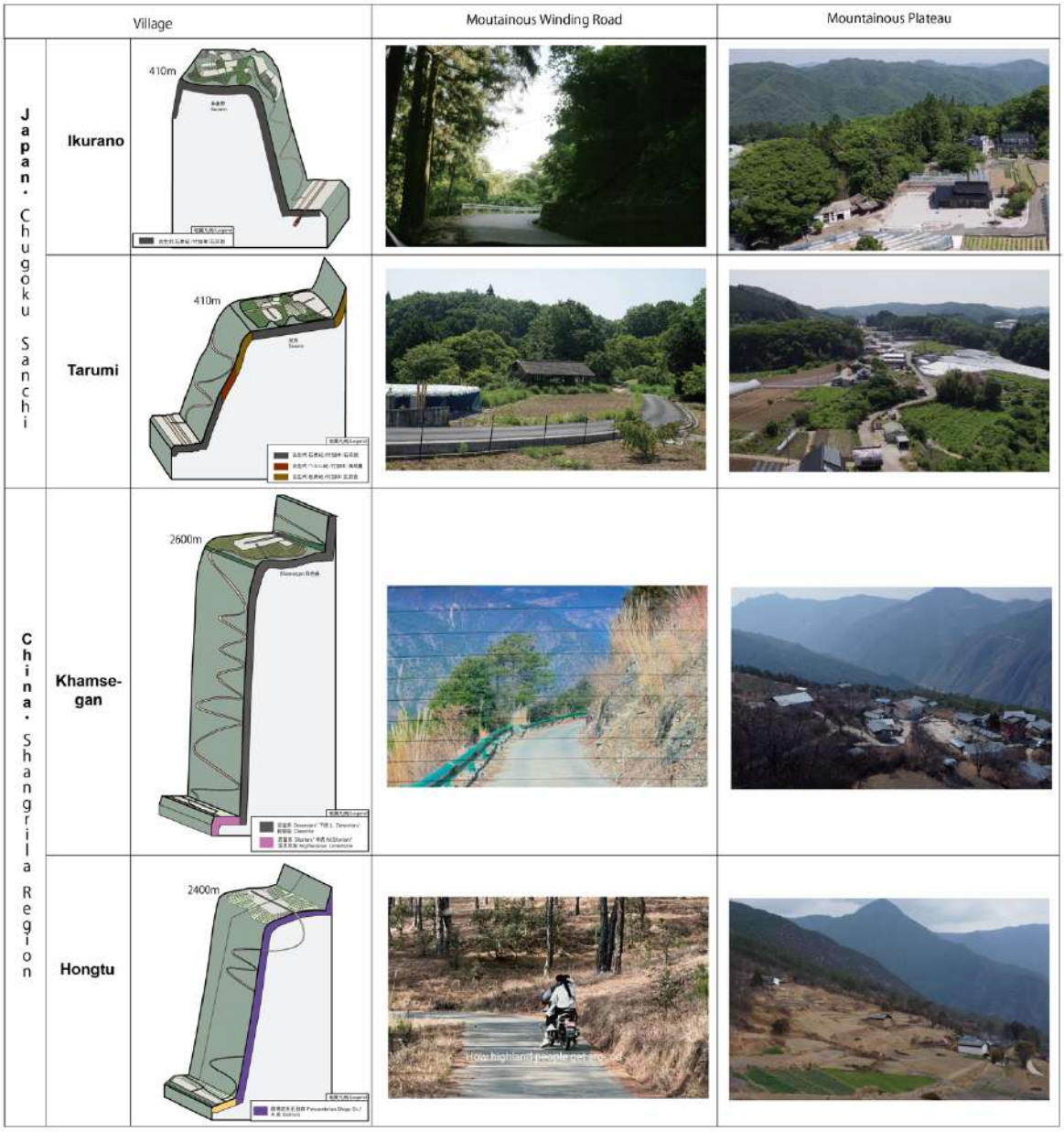


Figure 5- 5. The natural environment of traditional highland villages in research area[91]

Therefore, this research illustrates the pattern of traditional highland settlements through a diagram (Figure 5-6) derived from an analysis of three essential elements: vertical elevation differences, trade interactions with lowlands, and inaccessible transportation structure.

[91] Created by the author, and the photographs were captured by the author.

Drawing upon the comparative analysis of 24 settlements and synthesizing information from preceding chapters, three distinctive features of highland settlements were ultimately identified.

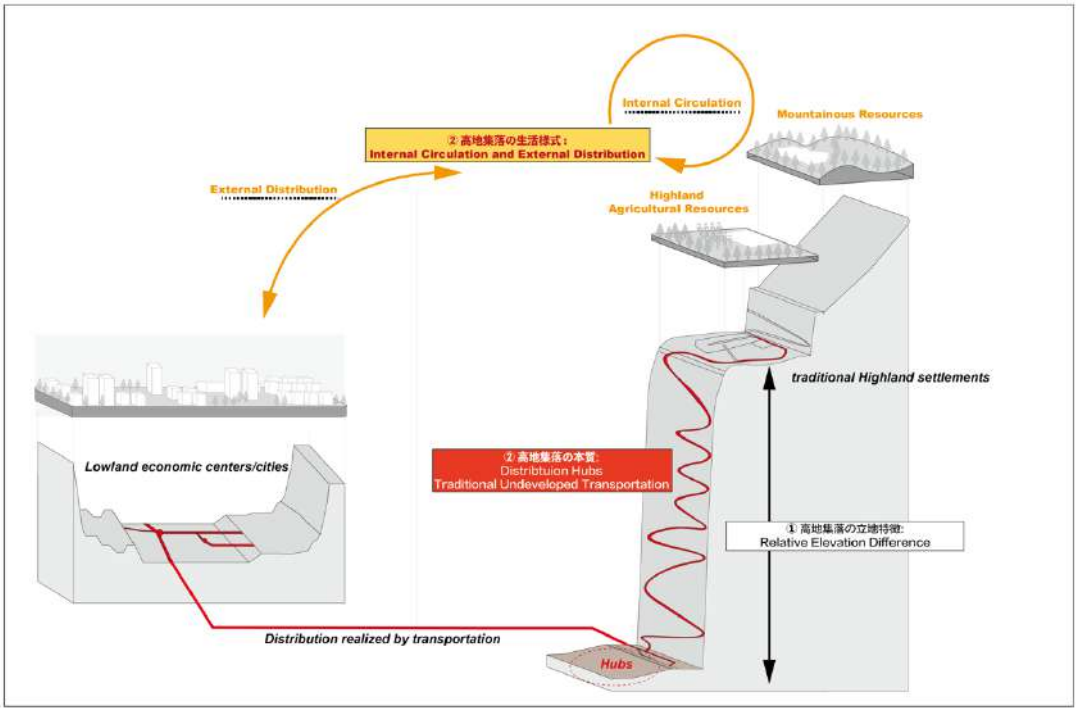


Figure 5- 6. The three characteristics of traditional highland villages in this research[92]

①. Features of traditional Highland Settlements (高地集落の立地特徴):
The isolationist nature of highland settlements is primarily determined by the relative elevation difference with the surrounding areas rather than the absolute elevation according to village sectional diagrams.

②. Livelihoods of traditional Highland Settlements (高地集落の生活様式):
Highland settlements have internal circulation within the community, and external distribution occurs in the flow of products with lowland settlements. These factors constitute a highland settlement survival lifestyle.

③. The essence of traditional Highland Settlements (高地集落の本質):
The essence of traditional highland settlements is deeply reflected in its dual nature. Firstly, they engage in close interactions with the lowland world, facilitated by the existence of an "economic hub" within the highland realm, rather than establishing direct connections with lowland settlements. This hub enables highland settlements, which are independent of the lowlands, to sustain themselves through external distribution. The second aspect concerns the underdeveloped transportation system that links the hub to traditional highland settlements. This lack of development is shaped by geography and terrain's unique attributes, particularly the vertical elevation differences. Modifying this underdeveloped transportation system has the potential to threaten the preservation of the Highland's indigenous culture.
It is worth noting that, up to now, most highland settlement research has tended to view only

[92] Drawn by the author.

the geographical characteristic as the essence of highland settlements. As a result, it fails to capture the accurate internal composition of traditional highland settlements. This study demonstrates how the three-dimensional elements of highland settlements can be deconstructed and visualized. However, the on-site research findings indicate that the crucial "sense of isolation" in traditional highland settlements is gradually diminishing due to the development of a comprehensive modern transportation system. For instance, in the study of highland residential architecture in Chapter 4, it has been observed that the architectural patterns of traditional highland settlements are undergoing modernization under the influence of changes in the modern transportation system (refer to Figure 4-13 for details). Section 5.2 of this chapter also demonstrates the impact of modern transportation systems on the spread of advanced building materials between lowland and highland settlements (refer to Figure 5-4 for details). A pattern of modern highland settlements, accompanied by transportation infrastructure improvement, is gradually emerging (Figure 5-7).

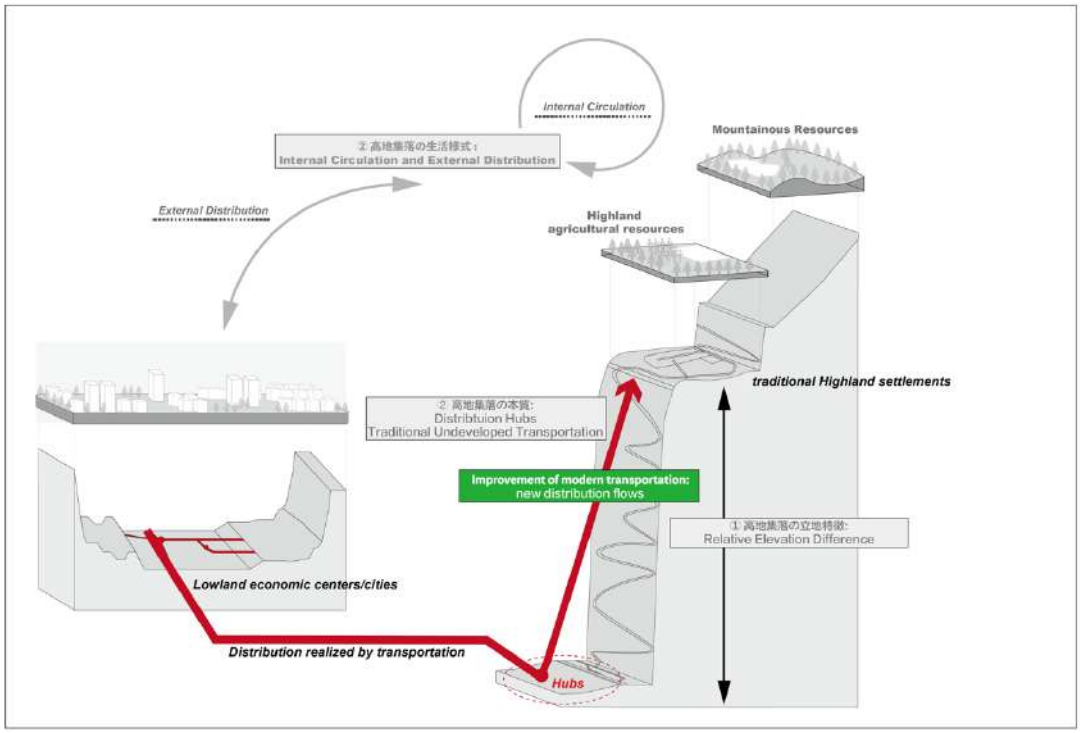


Figure 5- 7. The new pattern of traditional highland villages in modern period[93]

In this modern paradigm, a significant influx of lowland human resources, materials, and large-scale equipment from the lowlands is no longer difficult to reach the highlands. In the traditional highland settlement model (Figure 5-6), due to highland residents being more adept at overcoming the inconvenient mountain transportation system than lowland residents, highland settlements hold the initiative in trade communication with lowland settlements. However, when an unobstructed transportation system enters the highland world, this initiative shifts to the lowland world (Figure 5-7). As a result of modern road transportation, lowlands' civilization can spread into highlands more easily. According to the analysis conducted above, the rapid spread of lowland civilization can be attributed to three factors: manpower, technology, and materials (Figure 5-8). Conversely, the

[93] Drawn by the author.

transmission of natural resources from highland to lowland has maintained the traditional model without reaching the level of spreading civilization. Consequently, the highland world has undergone significant changes as a result of this unequal exchange.

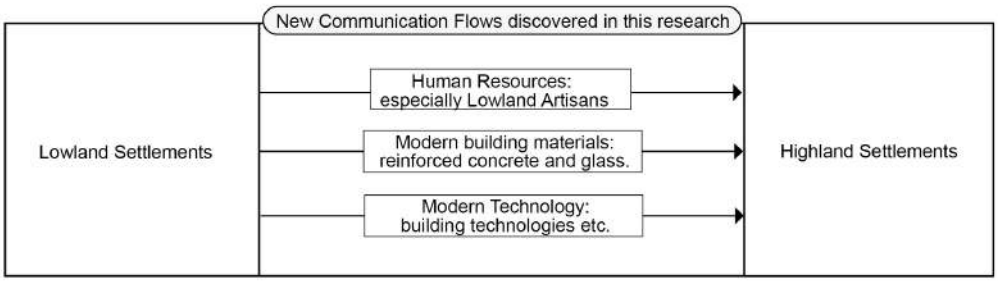


Figure 5- 8. The new communication flows discovered in this research

Therefore, the study of traditional highland settlements has entered a new phase: against the backdrop of modern transportation development, what is the future of traditional highland settlements, and how should their traditional culture be preserved? Answering this question, it involves more complexity and is challenging to address. Based on the findings of this study, the perfection of the modern transportation system is unstoppable, thereby ensuring an irreversible flow of lowland culture. When traditional highland settlements are no longer hidden, the question that traditional highland settlements should pursue is whether it is possible to achieve a "traditional highland settlement in an open world." Taking Shangri-La as an example, if the spread of reinforced concrete is irreversible, and lowland artisans are essential for constructing buildings, the primary consideration should be whether traditional Tibetan culture can coexist with modern materials and lowland ethnic craftsmen. Under this situation, all highland settlements must integrate the essence of highland ethnic culture with the essence of lowland ethnic culture to achieve sustainable development. Hence, this research will explore the prospects for traditional highland communities based on the analysis of highland settlements.

5.4 Predictions and Suggestions

The research begins by forecasting the future development patterns of traditional highland settlements based on the acquired data. Simultaneously, it analyzes the contradictions and conflicts faced by Highland residents during settlement development. Finally, the study proposes a concept of sectional protection suggestion for Highland settlements that serves as a references, balancing development, and preservation.

5.4.1 Predictions for the future of traditional Highland settlements

The global evolution from tribal forms to current societal structures has stabilized significantly. Since Scott analyzed non-sedentary ethnic groups in Southeast Asia, the connections and interactions between highland and lowland settlements have progressed rapidly. Prior to World War II, mountains served as a protective barrier, conveying the idea of an "unreachable utopia" for highland settlements. Modern technology, however, has overcome this geographical barrier. Efficient transportation systems now connect the once-remote highland world. There is a likelihood that mountain geographical barriers will diminish or even disappear soon. Thus, tracing the evolution from historical stages to the future, the distribution models between traditional Highland

settlements and lowland areas can be categorized into four stages as follows (as shown in Figure 5-9):

① Phase I - The underdeveloped stage of distribution (discussed in chapter 1):
The formulation of Highland settlements in south Asia is characterized by the Zomia model that proposed by James C. Scott. In his model, lowland farmers sought refuge in the mountains to escape excessive taxes levied by lowland state authorities. Leveraging the protective nature of the mountain terrain at that time, they established the initial pattern of upland settlements.

② Phase II - Autonomous distribution between Highland and Lowland (reflected in chapter 2 and 3):
The second stage is motivated by the limited survival resources of highland settlements, leading to an autonomous trade flow between these settlements and the lowlands. Through the analysis of this flow, it is observed that highland settlements have an external cycle of "highland settlement - economic hub - lowland."

③ Phase III - Rapid development of modern distribution (discussed in chapter 4):
The third phase unfolded with modern transportation advancements, facilitating a closer distribution between lowland and highland settlements. The pervasive influence of advanced science and technological civilization penetrated highland settlements, affecting local culture. With the development of modern transportation, the significance of mountain barriers has diminished significantly. Neglecting to analyze and comprehend this phenomenon in future development may result in transitioning into the fourth stage.

④ Phase IV - Future stages:
Due to modern distribution's pervasive impact, the boundaries between upcoming highland settlements and lowland communities will increasingly blur. Highland settlements will transform over time, encircling lowland areas, and the once imposing mountain barrier will vanish entirely. Ultimately, the culture of highland settlements will assimilate into that of lowland communities or give rise to an entirely rebranded modern culture that defies definitive identification with either side.

Moreover, chapter 4 also reveals the multiple contradictory standpoints of highland residents when confronted with lowland culture, by focusing the research perspective on highland residents immersed in change currents. Despite the changes in modern Tibetan residences brought about by lowland craftsmen, highland residents remain the primary occupants. Due to numerous inconveniences in traditional Tibetan dwellings—such as the absence of toilets, cohabitation with livestock, and the lack of piped water—highland residents, constrained by their limited capacity for design and modification, found the courtyard-style structure introduced by lowland residents to be their sole alternative for enhancing living conditions. After the improvement of the living environment by lowland craftsmen, highland residents moved their daily living spaces out of old Tibetan houses. However, they maintained the sacred functions of Tibetan houses, such as the presence of a shrine or Buddhist temple. Highlanders enter the sacred space of the primary Tibetan house for worship after cleansing themselves every day, ensuring the cleanliness of the foremost Tibetan house. Inadvertently, Highland residents, in terms of the use of their houses, have been assigned a hierarchy of high and low or clean and unclean. Traditional Tibetan dwellings occupy the first order of residence due to a Buddhist shrine and are treated with the utmost care. On the other hand, lowland craftsmen construct auxiliary modern cottages serving as secondary-tier spaces

for daily living needs, are used more casually. Consequently, Highland residents simultaneously "embrace" lowland craftsmen's technological innovations while "resisting" the loss of their indigenous culture. There is a conflict between tradition and modernity evident in them.

In the past 20 years, numerous Asian scholars have conducted extensive research. They have expressed concerns about the potential disappearance of indigenous cultures, such as ethnic minorities like Tibetans living in highland areas. It is common for them to categorize the distribution of people from lowland areas due to modernization or urbanization rather than discussing the essence of this phenomenon. Many believe that only a complete adherence to indigenous practices can preserve original traditions. Criticism of the loss of traditional culture among Chinese ethnic minority groups has become prominent today. Most scholars oppose economic development and emphasize the preservation of all traditional cultures. However, economic policymakers advocate prioritizing the economy's capabilities, believing that cultural preservation depends on elevating socioeconomic levels. The inherent opposition and lack of reconciliation between these two perspectives fail to convince each other and, more importantly, do not provide adequate guidance for highland settlement development. Examining the results of this research, the contradiction between these two perspectives lies in the former unconditionally adhering to the viewpoint of the "protective role of mountain barriers," while the latter advocates a "forceful promotion of modern distribution modes." This study, situated between the mentioned Phase III and Phase IV, has identified policy recommendations suitable for dynamically constraining the development of highlands in relation to lowlands.

5.4.2 Suggestions for the future development of traditional Highland settlements

The strategy proposed in this section is first grounded in the acceptance of "infrastructure" development, highlighting that transportation construction is a prerequisite for regional development. Adopting transportation development means accepting modern circulation that will persist in reaching highland settlements, since this is a historical crucial element of constructing the living environment of highland residents. To counterbalance or alleviate the rapid expansion of this modern circulation pattern, this study suggests the establishment of a dynamic protection barrier. In addition to being dynamic, this protective line is also closely linked to economic development. Specifically, the study asserts that the issue of vertical energy consumption should be considered when expanding the economic radius from lowland to highland settlements. In this context, energy consumption refers to infrastructure development costs. Suppose there is a significant elevation difference between highland settlements and economic centers in the vertical direction. In that case, diffusion and development from the economic center to such settlements will incur higher costs than settlements with similar horizontal distances but no elevation difference. Instead of initiating construction in highland settlements with substantial vertical elevation differences, it might be more eco-friendly to adhere to highland settlement distribution patterns. This involves adopting a development approach that constructs a large economic center—small economic center—highland settlement. Namely, urban development initiatives can enter settlements within the highland world, known for their long-standing economic and trade characteristics. However, it is not advisable to invest substantial sunk costs in highland settlements lacking economic attributes, as displayed in Figure 5-10.

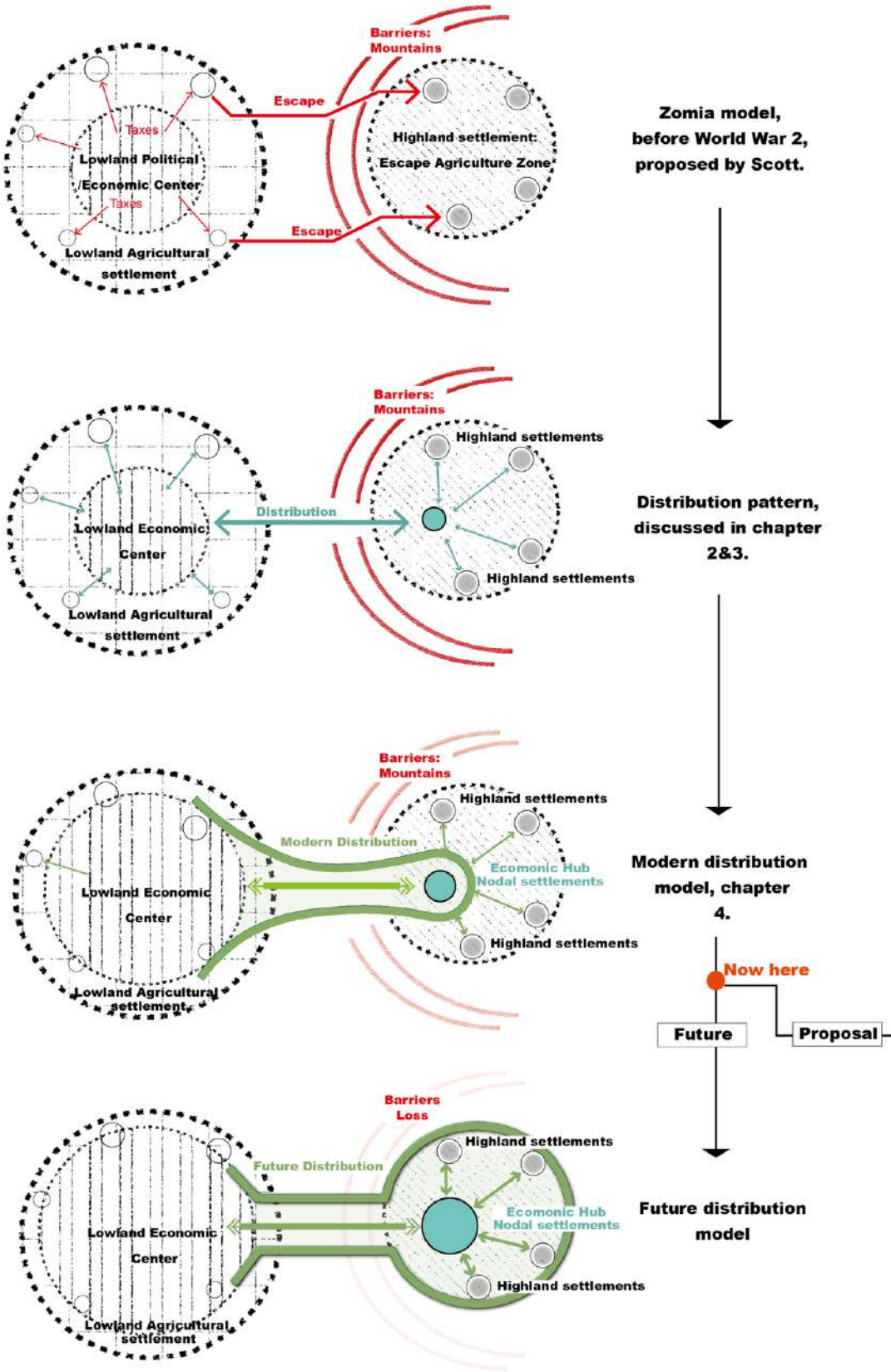


Figure 5- 9. Changes in the distribution relationships between Highland and lowland Settlements

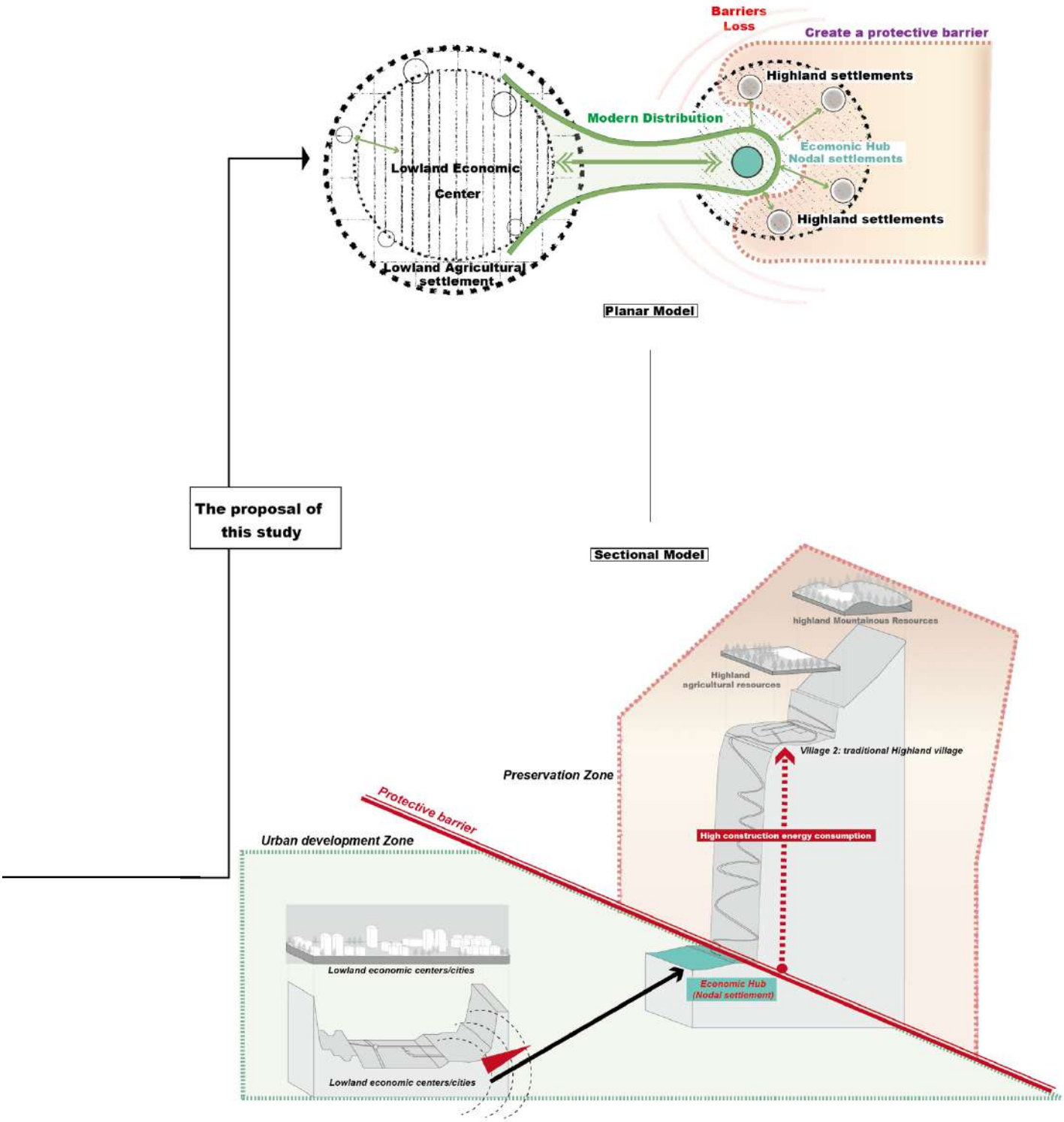


Figure 5- 10. A dynamic proposal based on energy consumption

This strategy necessitates those urban developers identify the three crucial nodes of "Lowland - trading center (Economic Hubs) – Highland settlements." Essentially, it involves a departure from the traditional approach of distinguishing "highland" from "lowland" solely based on elevation. In this model, it becomes particularly imperative to review highland settlement external distribution history and patterns. This helps all urban designers identify the existence and location of the Economic Hub, enabling the formulation of effective protection strategies for the development of highland settlements. Logical thinking can be broken down into the following steps.

Distinguish traditional highland settlements.

Identify the distribution direction of traditional highland settlements.

Recognize the economic center radiating from highland settlements.

Formulate development strategies based on "a large economic center—small economic center—highland settlement", instead of built construction directly on highland settlement.

Additionally, there is also the issue of internal preservation of the "highland settlement" local culture. Chapter 4 points out a significant shortage of local craftsmen within highland settlements who can carry forward traditional building practices. It is essential to pay close attention to this factor as it has a significant bearing on the inheritance of indigenous culture. While highland residents actively seek out lowland craftsmen to construct their homes, the training of traditional highland craftsmen should be noticed. It is aimed at evoking the cultivation of highland local craftsmen by different organizations in this study.

During the 1970s, Yoshizaka Takamasa formulated a persuasive idea while researching highland towns in the Alps. Yoshizaka argues that highland villages manage a precarious balance among inherent conflicts, rivalries, organizational structures, and disorder within the broader framework of lowland culture. Achieving a proper balance can result in fascinating architectural designs and the unique cultural characteristics of the settlement. In addition, Yoshizaka noted that residents in highland regions use stone foundations to support higher timber components rather than reinforced concrete, representing an architectural protest against lowland culture[94]. Many Swiss highland settlements below the Alps are still searching for a balance between modern materials and traditional stone-wood structures that can express local highland characteristics. This is also the final expression this study attempts to convey—achieving a healthy balance is the key to preventing highland settlements from being overwhelmed by lowland culture.

5.5 Summary

The above is the complete interpretation of highland settlements in this study. From the architecture perspective, utilizing the analytical dimension of spatial characteristics in this discipline, the study presents the form and patterns of highland settlements through the dual combination of settlement cross-sections and plans. This research is an initial exploration of the three-dimensional appearance of highland settlement spaces, extending the gaps in three-dimensional studies of settlements from an architectural perspective. Notably, transportation has a subtle but significant effect on highland settlements, an aspect that is often overlooked. Objectively speaking, in the last century, scholars like Kunio Yanagita, Tsuneichi Miyamoto, and Toni Hagen traversed the

[94] Cited from 6) 二川幸夫, 吉阪隆正. (1973). 世界の村と街 No.6 アルプスの村と街. A.D.A. EDITA Tokyo Co., Ltd. p. 23. The original Japanese words are as followings:
"……従って住宅もまた、石を用いて下層を作り、上層は木造のままというのが、森の住人の最大の抵抗力ではないかろうか……"

mysterious highland world on foot due to transportation inconveniences. In this century, highland settlements, as James C. Scott declared on the opening page of his Zomia study, “This study is only applicable to the world before World War II,” are witnessing the protective barriers of traditional highland settlements being rapidly breached by the development of science and technology, which has transcended conventional understanding. As the most crucial element for spreading modern civilization, transport is also the primary medium for introducing lowland civilization to highland civilization. It will undoubtedly undergo technological expansion in the future. As a result of technological advancement, mountain paths will become highways that can easily transport concrete, and highland settlements, products of seclusion that extend back to ancient times, will become easily accessible. Therefore, the more we explore the essence of highland settlements, the more apparent it appears that their “isolation” will gradually disappear in the face of advancing technology.

5.6 References

1) Jean Brunhes. (1921). La géographie de l'histoire, géographie de la paix et de la guerre sur terre et sur mer (Human Geography). Paris, F. Alcan.
2) Kohl, J. G. (1841). Der Verkehr Und Die Ansiedelungen Der Menschen in Ihrer Abhängigkeit Von Der Gestaltung, Dresden. (German)/
淡川康一. (1935). 交通及び集落と地形,古今書院.
3) Ratzel, F. (1903). Politische Geographie, oder die Geographie der Staaten. Walter de Gruyter GmbH & Co KG.
4) Yamaguchi, H. (1971). Kotsū chiri no hōhō [Methods in Transportation Geography]. Jinbun Chiri [Human Geography], 23(5), 467-494.
山口平四郎. (1971). 交通地理の方法. 人文地理, 23(5), 467-494.
5) 中谷礼仁, 庄子幸佑, & 鈴木明世. (2022). < 千年村> 研究その 1: 平安期文献 『和名類聚抄』 の記載郷名の比定地研究を用いた< 千年村> 候補地の抽出方法と立地特性に関する研究. 日本建築学会計画系論文集, 87(791), 221-231.
6) 二川幸夫, 吉阪隆正. (1973). 世界の村と街 No.6 アルプスの村と街. A.D.A. EDITA Tokyo Co., Ltd.

Chapter 6. 結論・Conclusion

6.1 Summary of this research・本研究のまとめ

6.2 The prospect of future research・将来の研究の展望

Chapter 6　結論・ Conclusion

6.1 Summary of this research

This study set out to gain a better understanding of traditional Highland settlement through the research view of architecture history. This research, first employing the historical tracing method of architectural history, reviews representative research outcomes on highland settlements from various disciplines worldwide since the 19th century. Disciplines such as geography, ethnology, folklore studies, and architecture have contributed to understanding highland settlements. Based on a literature review, it is found that the current academic focus still predominantly analyzes highland settlements from the perspective of 'absolute elevation,' overlooking the lifestyle of economic trade and material exchange between residents of highland and lowland settlements. Moreover, existing academic achievements often focus on planar analyses, unable to capture the multidimensionality of traditional Highland settlements. This study investigates the interconnection between highland and lowland settlements to address the abovementioned gaps. It leverages architectural spatial analysis capacity to depict highland settlement characteristics through three sectional views visually.

Chapter 1 unveils the study's foundation, grounded in a comprehensive exploration of distribution patterns within high and low regions through a thorough literature review. Furthermore, the research identifies prospects for conducting comparative studies by adopting a broad watershed perspective to discern traditional Highland settlements in China's elevated areas and those in the lower-altitude regions of Japan.

Chapters 2 and 3 examine the practical application of research methodology. In Japan and China, watersheds are identified, and 12 settlements are selected for each. Comprehensive investigations are conducted into the history, lifestyle, transportation, and dwellings of 24 settlements. Finally, watershed cross-sectional diagrams and village analysis cards are obtained for each region.

In Chapter 4, changes in residential styles discovered during the research led to exploring the exchange of architectural craftsmanship facilitated by transportation systems between highland and lowland settlements. Chapter 5 explores the characteristics and essence of highland settlements using cross-sectional diagrams obtained from chapters two and three.

Based on the results of this research, three main conclusions can be drawn:

- Absolute high-altitude settlements do not equate to Highland settlements. Highland settlements are characterized by their "isolated" nature due to relative elevation differences rather than absolute elevation. This is the external characteristic of a highland village, which a wide variety of disciplines can easily understand.
- Highland settlements have internal circulation within the community, and external distribution occurs in the flow of products with lowland settlements. These factors constitute a highland settlement survival lifestyle.
- The essence of traditional highland settlements is deeply reflected in its dual nature. Firstly, they engage in close interactions with the lowland world, facilitated by the existence of an "economic hub" within the highland realm, rather than establishing direct connections with lowland settlements. This hub enables highland settlements, which are independent of the lowlands, to sustain themselves through external distribution. The second aspect concerns the underdeveloped transportation system that links the hub to traditional highland settlements. This lack of development is shaped by geography and

terrain's unique attributes, particularly the vertical elevation differences. Modifying this underdeveloped transportation system has the potential to threaten the preservation of the Highland's indigenous culture.

Understanding these three points reveals the complete picture of highland settlements. The study suggests that scholars in Chinese architecture and planning, enthusiastic about exploring the "modernization of Tibetan highland worlds," can investigate and understand this phenomenon through the above three elements. Overall, the study's contribution lies in providing a three-dimensional and visual representation of the "mountain-island" features of highland settlements and interpreting their constitutive elements. Additionally, the study affirms architecture's unique spatial description and reading abilities in settlement research, surpassing other disciplines.

6.2 The prospect of future research

This research represents an initial exploration into the essence of highland settlements, and the research findings on the significant impact of transportation modes on highland settlements serve as a reference for future studies in this area. Despite this, this study has some limitations. For instance, the concept of "traditional highland settlements in an open world" proposed in the discussion section is more of a conceptual idea. In fact, upon reviewing the current status of highland settlements worldwide, only the operational model of highland settlements below the Swiss Alps might offer an answer with broad applicability. Nevertheless, it was not possible to conduct relevant research on Swiss highland settlements in this study due to constraints in research time and scope. With the current research foundation as a foundation, the author intends to conduct a comprehensive investigation of traditional highland settlements in Apls to provide an accurate response to the future of these settlements. Using the current research results, the authors intend to investigate more highland settlements around the world to formulate a specific strategy and answer.

Funding details

This research was supported by the China Scholarship Council CSC202007030007.

Disclosure statement

The authors report there are no competing interests to declare.

Date Availability statement

The authors confirm that the data supporting the findings of this study are available in the article and appendices.

Figure captions

Chapter 1

Chapter 2

Chapter 3

Acknowledgements 謝辞

4 年間続けた研究が今月で終わりを迎えます。この研究を助けていただいた方々に感謝を申し上げます。

まず、指導教官として終始多大なご指導を賜った、中谷礼仁先生に深謝致します。中谷先生は高地集落についての深い理解と高地と低地の流通関係を明瞭にするために、この研究を指導・励ましいただきました。4 年前、シャングリラ高地の出身である私に幅広い学問の扉を開いてくださり、その後の 4 年間で中谷先生のご指導により豊富な知識を得られ、研究力と理解力を高めることができました。

木下剛先生と小岩正樹先生には、本論文の作成にあたり、副査として適切なご助言を賜りました。感謝申し上げます。木下先生の生産物流通に関するご提案により、高地集落の生活様式について新たな理解を得られ、この研究がより深まりました。小岩先生は高地集落の立地特徴を断面図的な分析すべきだとの示唆をいただき、そのおかげで研究の幅が広がりました。

続いて、日本で行われた高地ゼミ調査においてご参加いただいた先生方に感謝の意を表します。酒井先生は現地調査中に地理地質について貴重な知見を共有していただき、菊地先生は民俗文化に関して詳細に解説してくださいました。前川先生は建築をご指導いただき、恵谷先生は生業要素に関する洞察を提供してくださいました。

また、日本と中国の現地調査の際、聞き取りに協力してくださった地元住民に深く感謝いたします。

研究室のメンバーにも、本論文の執筆にあたり多くのご助言、激励を頂きました。
同期の徐子さんには図面のレイアウトに関する助言をいただきました、谢谢！東野さんには断面図における知見と経験を共有していただき、大変助かりました。また、二上さんと塚原さんには研究室で常に論文の構成について議論していただき、Elise と口石さんには D 論の進捗状況に関する助言を何度もいただきました。Merci!
本研究の遂行にあたり、2022 年に中国山地調査に参加した皆様に、感謝いたします。未熟なリーダーとして、お世話になりました。皆様のご協力がなければ、この研究は実現しなかったと認識しております。

中谷研究室の皆様、4 年間にわたりお世話になりました。未熟な先輩として、心から感謝申し上げます。

最後に、シャングリラにいる家族に感謝します。
家人对我的爱，是我能完成博士研究获得博士学位的养分和沃土。他们陪实地调研、帮我收集资料。我是一个如此幸运的孩子，因为我有这世上最好的父母，和最好的家人。同时，我想将这一份研究作为礼物送给已经在天上守护我两年的爷爷。他变成星星的日子，让我偶尔黑暗的世界变得闪耀。最后的最后，感谢我自己，感谢我再艰难都从未想过要放弃。
ཇྱག་ཏོལ་མཚོ་བཀྲད།　ཞདས་བཟེས་བདེ་ལེགས།

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○論文	**Yiling Hua**4&45 0 ihit045 6k6t6ni4(2023)4St2dy4h84nf328nc8940f48thnic4H6n46nd48thnic4B6i40n4Iidi4vi336g8’947 0d8 n4Tib8t6n4lw833ng94n4Sh6ng i-L6,4Chin6,4l02 n6340f4A9i6n4A chit8ct2 846nd4B2i3ding Engin88 ing,422:6,43320-3337,4DOI:410.1080/13467581.2023.2205476
○論文	**Yiling Hua** &45 0 ihit045 6k6t6ni.4(2023).4Hi9t0 ic4c0n98 v6ti0n4n4Tib8t6n4 8gi0n467 id9t4 6pid 2 b6niz6ti0n:464c6984t2dy40f4D2k8z0ng4O3d4T0wn.4l02 n6340f4A9i6n4A chit8ct2 846nd4B2i3ding Engin88 ing,41-15.
論文	H2i,4L.,4**Yiling, H.**,4Y6d0ng,4L.,4Y2,4Z.,4Zhiying,4L.,4H0ngh0ng,41.,4&4Ii6h60,4R.4(2021).4On4Chin898 App 06ch4044Th80 8tic634St2dy40f4U b6n4G 0wth4B02nd6 y4(UGB).4H27 6n-C8nt8 8d4U b6n4P36nning46nd D89ign4n4Chin6:4V0327 841:4U b6n46nd4R2 634P36nning,43-27.
報告書	产　　流域調査報告書.(2021). 中谷礼　研究室千年村ゼミ. **Hua Yiling** 共著(日本語)
報告書	那賀　流域調査報告書.(2022). 中谷礼　研究室千年村ゼミ. **Hua Yiling** 共著（英文)
○報告書	中国山地高梁　・日野　調査報告書.(2023). 中谷礼仁研究室千年村・高地ゼミ. Hua Yiling 共著 (英文)