

Soul for Seoul



DIPLOMARBEIT

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Kurzfassung

Um eine erfolgreiche Architektur für einen bestimmten Ort zu entwerfen, ist es wichtig, Traditionen zu respektieren.

Das Ziel meiner Diplomarbeit ist es, die Menschen über den Lebenszyklus des Reises zu sensibilisieren.

Dabei soll gezeigt werden, wie man Reis und dessen Nebenprodukte auf intelligente und ökologische Weise produzieren und konsumieren kann. Heutzutage ist man gewohnt in ein Geschäft zu gehen und das gewünschte Produkt zu kaufen, aber sehr selten oder gar nicht sind wir uns über die Herkunft und die Geschichte des Produktes bewusst, selbst wenn dieses Produkt so tief in die lokale Tradition integriert ist, wie Reis für Südkorea.

Wir leben in einer Zeit, in der die Abfallproblematik auf der Tagesordnung steht und der Klimawandel uns endlich dazu zwingt, die Wahl der Baumaterialien besser zu bewerten.

Dabei geht es nicht nur darum, ökologisch solidarisch zu handeln, sondern es geht im Speziellen auch um unsere eigene körperliche Gesundheit.

Die südkoreanische Hauptstadt Seoul steht in diesem Projekt im Fokus.

Während einer einmonatigen Recherche vor Ort untersuchte ich die Bedeutung von Reis für Süd-Korea und kam dabei auf verschiedene Probleme im Zusammenhang mit der Produktion und dem Konsum von Reis.

Reis ist ein Grundnahrungsmittel der koreanischen Kultur und nach der

Erntephase werden üblicherweise mehrere wertvolle Nebenprodukte weggeworfen oder verbrannt. Darüber hinaus ist der Verbrauch von Reis im Land deutlich zurückgegangen, während die Produktion konstant geblieben.

Meine Diplomarbeit *Soul for Seoul* ist ein urban didaktisches Dorf in dem Stadtteil Jamsil in Seoul.

Es kann als Lösung Ansatz gesehen werden für Probleme, die während der Produktions- und Verarbeitungsphase dieses lebenswichtige Getreide auftreten.

Ein weiteres Ziel ist es auch den Konsum von Reis wieder zu fördern.

Die Architektur von *Soul for Seoul* schafft das Bewusstsein natürliche Materialien zu verwenden, die sich nicht nur auf die ökologische Leistung beziehen, sondern auch auf das Wohlbefinden des menschlichen Körpers achtet.

Während meiner verschiedenen Reisen in Süd-Korea konnte ich vielen Fakten für meine Diplomarbeit sammeln, wodurch ist eine sehr enge persönliche und emotionale Beziehung zu Südkorea entstanden.

Abstract

To design a successful architecture for a specific place, it is important to respect traditions.

The aim of my diploma thesis is to sensitize people about the life cycle of one of the most important grains, rice, and all the factors which determinate a smart and ecological way to consume rice and its by-products. Nowadays we are used to enter in a store and buy our wished product, but too rarely or not at all, we are conscious about the life, the origin, and the history concerning the product, even if this product is so deeply integrated in the local tradition, like rice for south Korea. We live in an era where waste problematic is the order of the day and where climate change finally forces us to better evaluate the choice of materials for construction. This is not only about being eco solidary but also for our own physical health. The city in focus is the South Korean capital, Seoul. During a one month long local research I studied the importance of rice for the country, and it led me to the knowledge of several problems according to its production and consumption. Rice is a staple of the Korean culture and after the harvesting phase several valuable by-products are traditionally thrown away or burned. Moreover, the consumption of rice in the country decreased significantly while the production keeps steady.

Soul for Seoul is an urban didactic village for the district of Jamsil, in Seoul. It is a proposal to solve the problems that appear during the production and processing phase of this essential grain and it attempts to encourage the consumption of rice again.

From the architectural point of view *Soul for Seoul* embodies the awareness of using natural materials relating not only on the ecological performance but also on the importance of the wellness of the human body from the physical and sensitiveness comfort point of view.

The facts reported in my diploma thesis are partly a collection of the acquired knowledge on South Korea, which I had the pleasure and chance to enrich during my various trips in the country, creating a very close personal and emotional relationship with South Korea.

CONTENT

Research

12	Statement of the Problem
26	Research method
40	Rice and South Korea
52	Rice production in South Korea
66	Rice consumption in South Korea
78	Vernacular architecture in south Korea
96	Icheon Rice Cultural Festival
106	“Cradle to cradle” system with rice products

Soul for Seoul

120	Site
128	Concepts
148	Plans
168	Structure
186	Bibliography



Korean words for rice

Monaegi : rice planting

Byeo : rice plant

Ssal : uncooked rice

Bap : boiled rice

Ch'oe, Chong-hwa; Im, Hyang-ok (2016): This is Korea

“The empty space in front of the Jonmyo Shrine is a space of the soul, a fundamental space that never ceases to question us. Whenever I reach an impulse, I visit Jongmyo. And walk along its courtyard. Each time, I gain strength from a seemingly primordial source. Is this space, still so much alive, the archetypal substance of the Korean people?”

Seung H-Sang: Beauty of poverty, Mikunsa, 1996, 30th anniversary revised edition: Slow Walk, 2016.

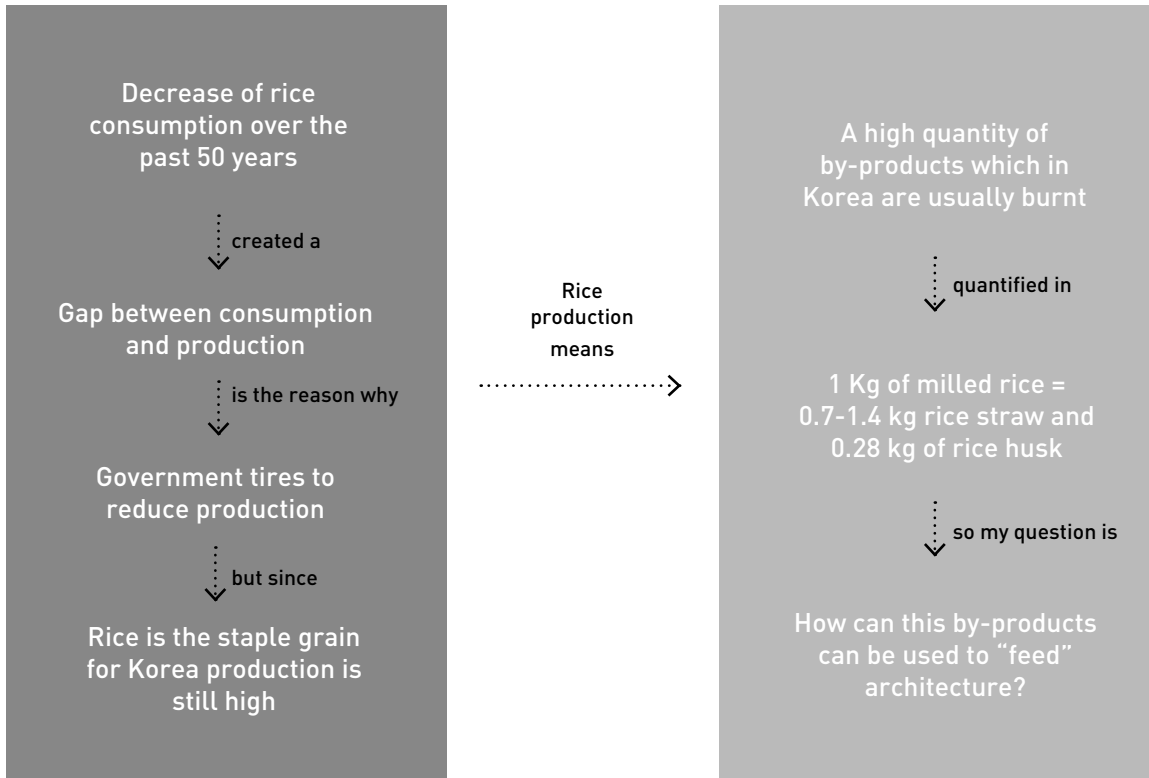


Jongmyo (Royal Shrine)
Main Pavillion, 1395 | 1608



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STATEMENT OF THE PROBLEM



November 2019. South Korea

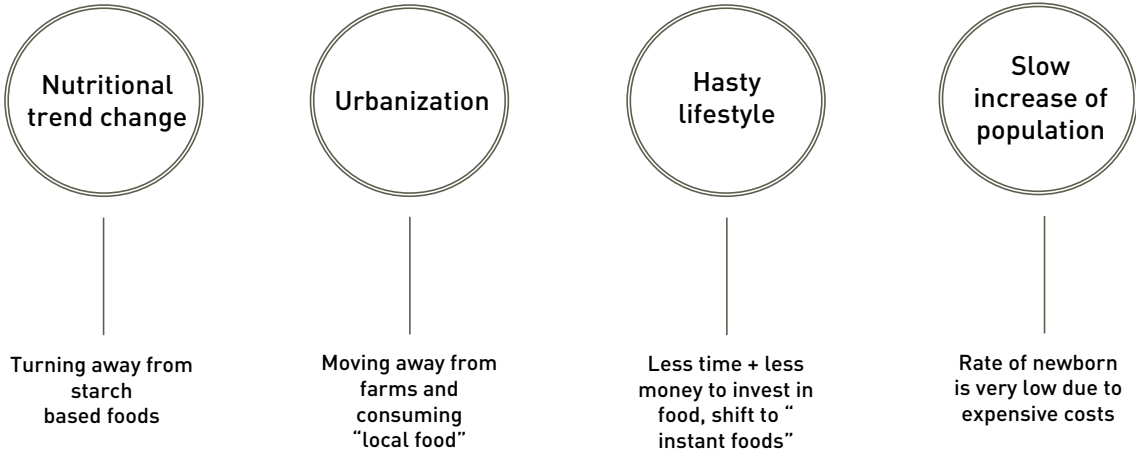
This diploma thesis deals with several issues related to the life circle of rice in South Korea. Starting from a gastronomic point of view and the research about the rice consumption customs in the county, where several weaknesses emerged. Nowadays we are used to enter in a store and buy our wished product, but rarely or not at all, are we conscious about the life, the origin, and the history of the product, even if this product is so deeply integrated in the local tradition, like rice is for south Korea.

We live in an era where waste problematic is the order of the day and where climate changes finally forces us to better evaluate the choice of materials for construction. This is not only about being eco solidary but also for our own physical health.

The rice production in South Korea found in the last decades several problems.

- 1) The gap between the production and the consumption
- 2) A not ecological disposal of the rice by products
- 3) The need of more productive urban landscape

Factors of decreasing consumption



Gap between production and consumption

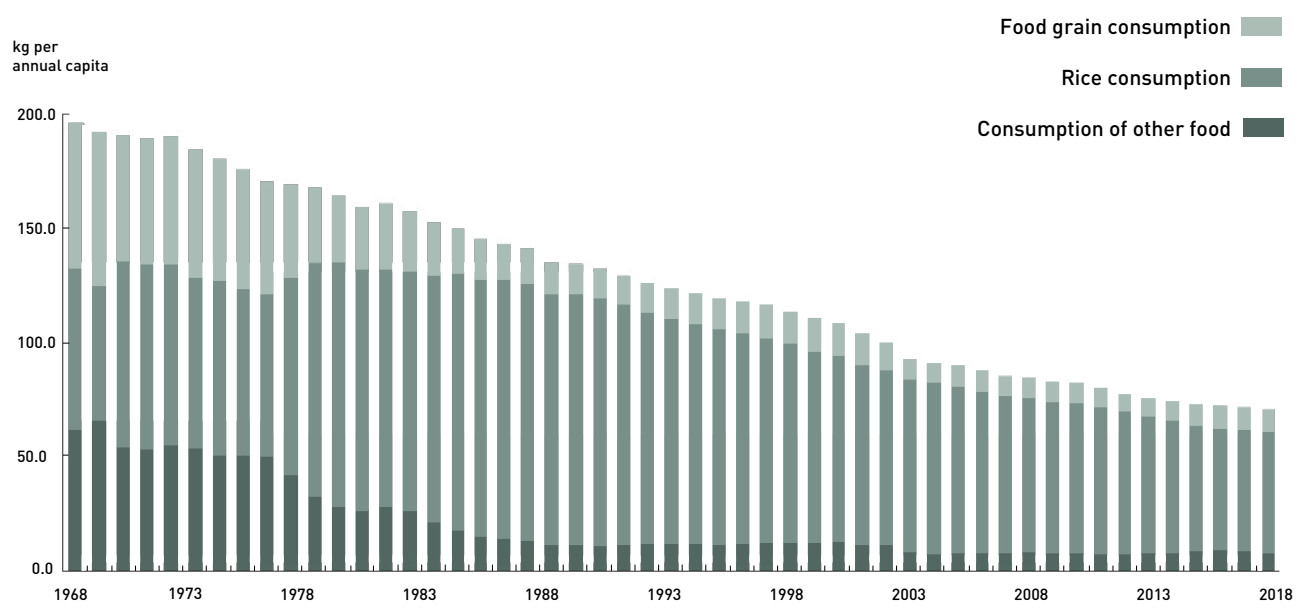
According to an USDA (United States Department of Agriculture) study on the rice market in South Korea, the rice consumption in the country has fallen dramatically over the past 40 years. In the 1970 the yearly consumption per person amounted to 137kg. During the mid-80's the consumption started to decrease until 2015 when it reached just 62 kg per person a year.¹

Despite the government's attempts to reduce the surface area for rice cultivation, its production remains steady. In contrast, the decline of consumption varies largely. From factors such as urbanization and the shift of "self-produced" foods consumption, to changes in hasty lifestyle and diets that quickly become "trends".²

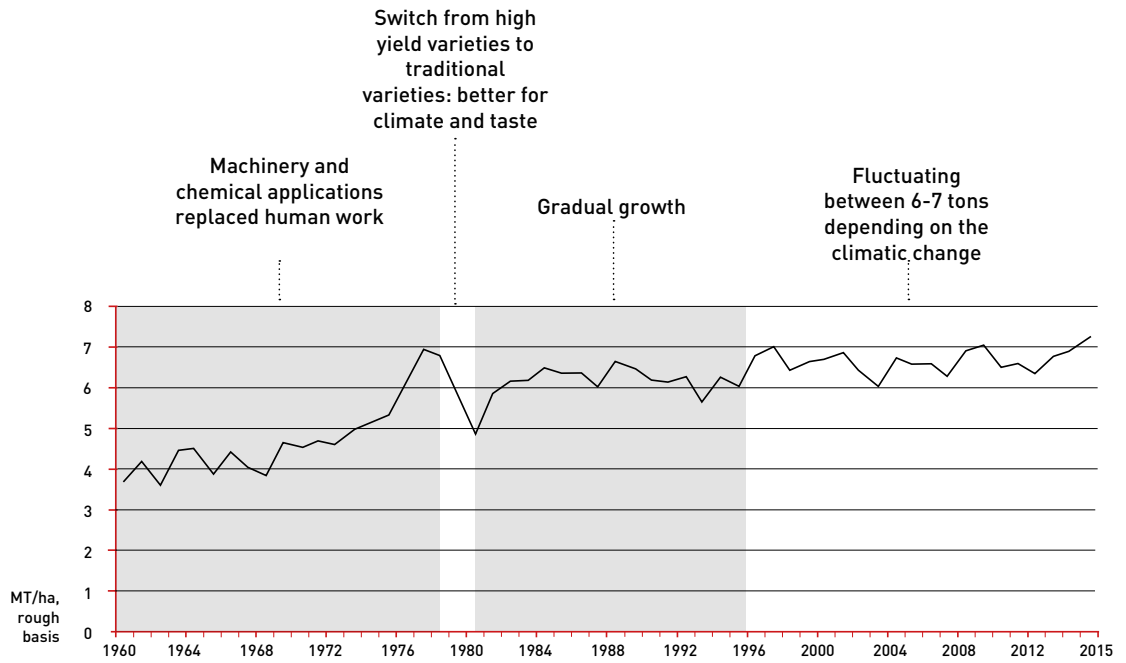
Since the consumption had a relevant decrease, the government attempted to reduce the production as well by stopping the import of rice and encouraging the farmers to replace the rice cultivation with other typologies of crops³. Nevertheless, as shown in the images on the next page, the yield of rice is still high, and the Korean farmers are constantly going on with the yearly production.

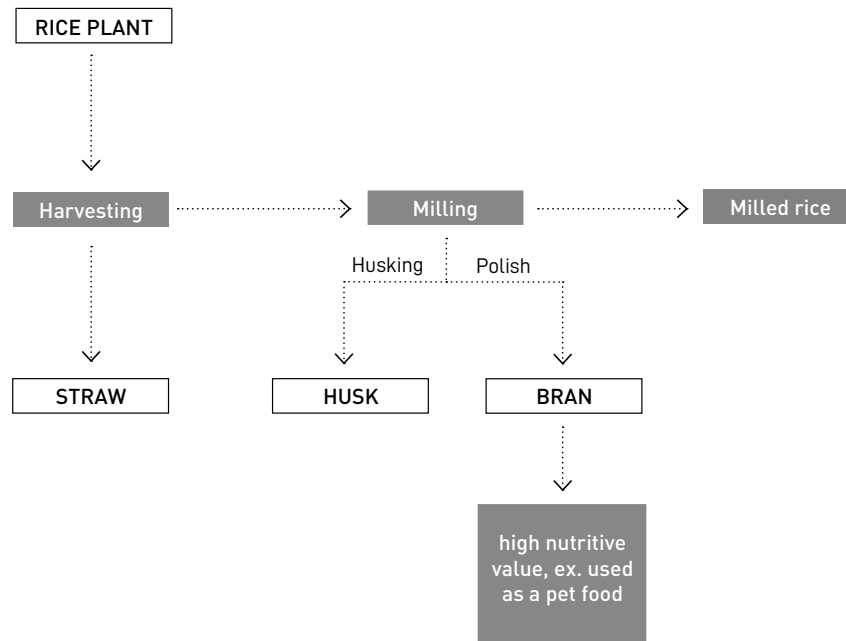
Rice is so deeply rooted in the Korean tradition, that it is difficult do decrease its production.

Rice consumption development



Rice yield





1 Kg of milled rice =
0.7-1.4 kg rice straw and
0.28 kg of rice husk

↓

in 2019 South Korea produced
3.8 million tons of rice:

2.6-5.3 million tons of rice straw
and
1 million tons of rice husk

Rice by-products afterlife

There are several methods used by the government to reduce production of rice, such as subsidy programs and international donations. However, it is not just about the rice itself. The grain of rice is only one result of a long production process that starts with insemination and ends with the final product.

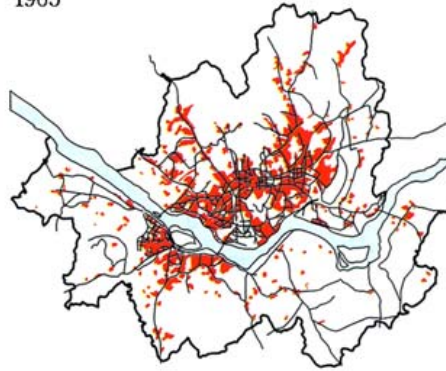
During the harvest season the rice is first reaped from the ground and then directly threshed. Threshing is the procedure where the rice is separated from the straw. Afterwards the rice needs to dry in the sun and then it is milled to remove the hull and several uneatable layers.

Straw and husk are just two of the relevant by-products of the rice production. Commonly those are burned for different reasons, causing an enormous amount of CO₂. Looking back to the Korean vernacular architecture traditions and at the new technologies which will be explained in the next chapters, there are different method where those by- products can be applied for building constructions.⁴

1958



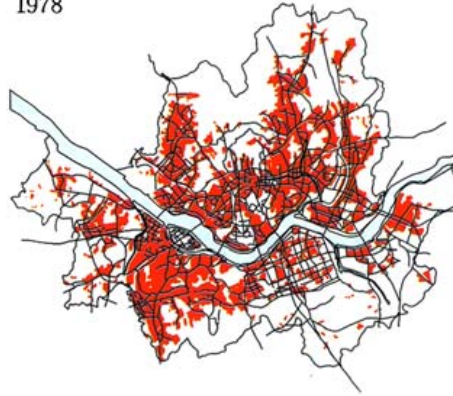
1965



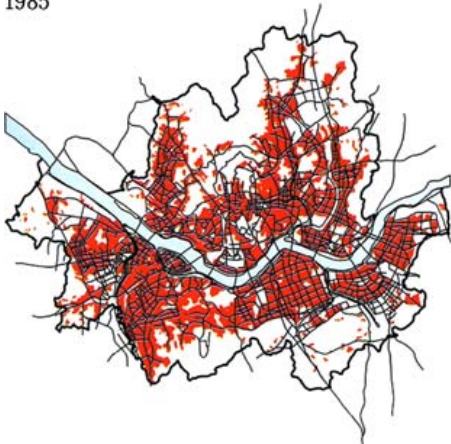
1972



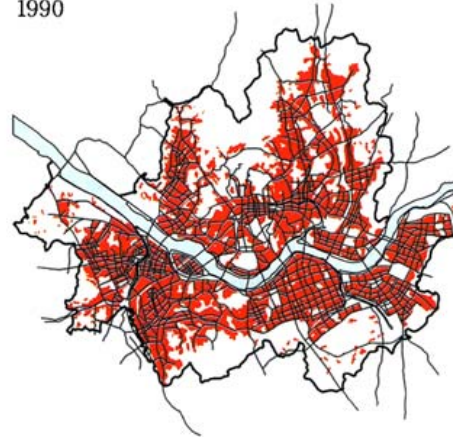
1978



1985



1990



Expansion of urban areas in Seoul since 1958

Need of productive landscape

“Overlaying the sustainable concept of Productive Urban Landscapes with the spatial concept of Continuous Landscapes proposes a new urban design strategy which would change the appearance of contemporary cities towards an unprecedented naturalism. Continuous Productive Urban Landscapes (CPULs) will be open landscapes productive in economical and sociological and environmental terms. They will be placed within an urban-scale landscape concept offering the host city a variety of lifestyle advantages and few, if any, unsustainable drawbacks.”⁵

We are living in an age where cities continue to grow without control. Looking at the graphic illustrating the urban development of Seoul, the city spread rapidly and that the green areas in the city territory are decreasing continuously. This causes not only a deterioration in air quality but has also affects the psychological status of the inhabitants, which are increasingly looking for green areas to rest from the hasty urban life and spend their free time. The Han, even called Hangang, is the river which crosses the south Korean capital. According to this problematic the Seoul Metropolitan Government announced a new project “The Hangang Renaissance project” which has the aim to create more green areas along the river belt, which will elevate the life quality standards of the inhabitants.⁶





Munjeonokdap, Rice paddy in front of house



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RESEARCH METHOD



Rice paddy after harvest in Ulsan

„A clever man finds the best education while traveling.“

Johann Wolfgang von Goethe (1749 - 1832), Source:
Goethe, Wilhelm Meisters Years, 1795/6. 5. Book 2. Cap.,
Quotation from a letter to Wilhelm



- Kitchens in Hanok typical floor plans -
Soul for Seoul, Chapter 1.
Exhibition OPUS ASIAE in Rome

OPUS ASIAE EXHIBITION ROME

To design a successful architecture for a specific place, it is important to respect the local traditions.

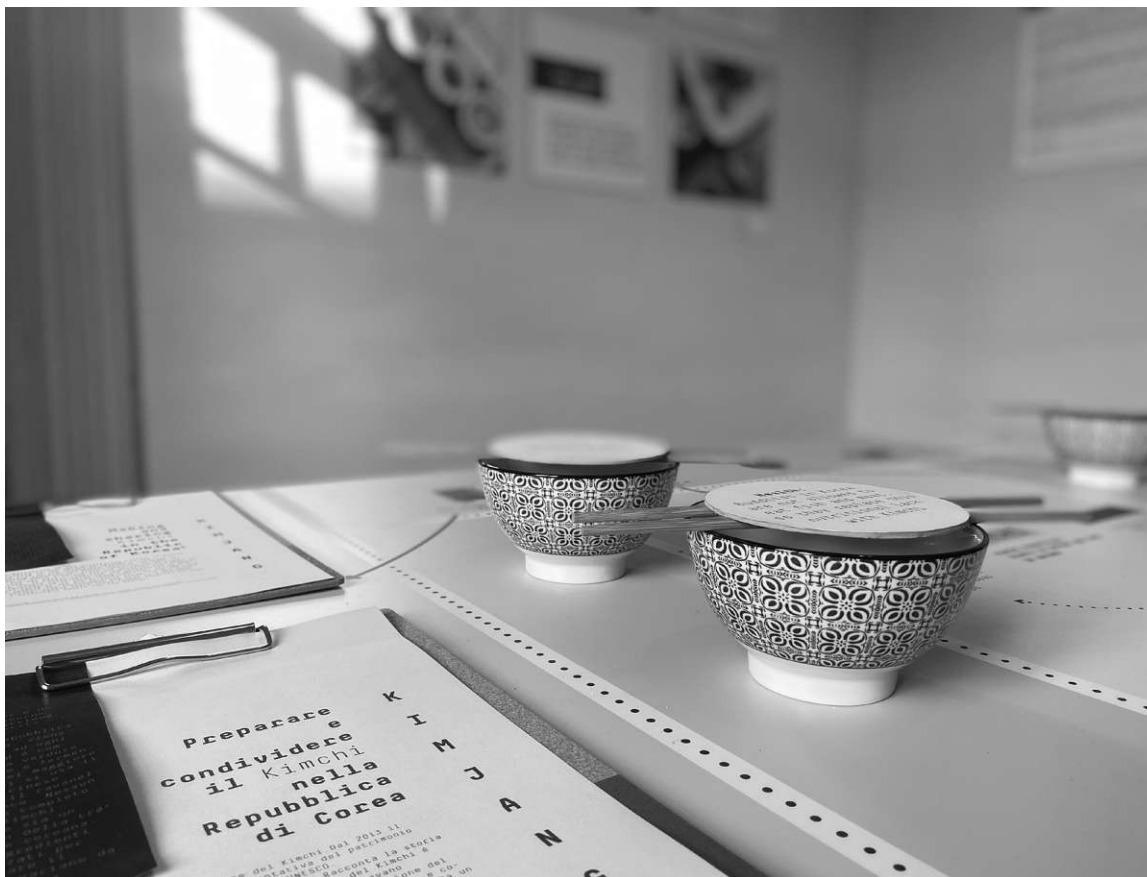
My research about South Korea's culinary tradition started in the beginning of 2019 during one of my first trips to Seoul. There I could collect knowledge about the amazing local traditions. In September 2019 I had the pleasure to contribute with my first chapter of research to the exhibition "OPUS ASIAE. Architectural Projects for Asian Cities", curated by Mladen Jadric and me, and displayed in the Hendrik Christian Andersen Museum in Rome.

The first chapter, titled "Architecture starts around a dining table", focuses on people's relationship with food in Korea, on the influence of food on people and space, starting from the setting of a table to the dining room and architecture in general.

Food defines our society, culture and pleasure, as well as determines our relationship with the natural world. In most of the cases we don't even notice how much this influence the relation of the space around the food by building in small scale like houses, temples to bigger ones like cities.

In the Korean tradition food dominates the body as well as the mind, this domination is the fundament of the relation with human. Recipes which often take very long to be prepared, for example Kimchi, deserves a lot of time and efforts. The care of every single detail, the focus on healing and healthy food, due to restoring energy, are the main characteristic of the Korean cuisine.

The exhibition presented examples of the Korean cooking tradition, including the "Kimchi Table," and analyses the local approach to architecture that "starts around the table".



- Kimchi Table -
Soul for Seoul, Chapter 1.
Exhibition OPUS ASIAE in Rome



- Korean food phrases -
Soul for Seoul, Chapter 1.
Exhibition OPUS ASIAE in Rome



Restaurant entrance, Ulsan

My trip to South Korea

In autumn 2019, I had the opportunity to conduct a second intensive research for my thesis at Pusan National University. Thanks to the support of Professor Lee and his students, who accompanied me during my research, I was able to learn and experience a lot about Korean culture and traditions. The aim of my stay was not only about visiting the cities but also the countryside.

One of my aims was to get in contact with the locals and gain knowledge about the South Korean traditions, especially the ones related to rice. Besides trying a lot of different dishes and taking cooking lessons, it was important for me to analyse the relationship between food and architecture in detail. Starting with the perception of space that comes from sitting on the floor during meals, to buildings dedicated to food production and processing.



Gamcheon Culture Village, Busan

In this context I had the chance to meet two Korean architects, who are both dealing with the relationship of culinary tradition and local architecture, Jinhee Park and Minkyu Kim. Both, despite their international work, have very strong ties to their homeland. Jinhee Park, head of the architecture firm SsD Architecture+Urbanism, develops new typologies with building materials such as Hanji, the Korean traditional paper, which is already used in various ways in the interior design of Korean houses. Ms. Park is currently researching the properties of this material resistance and bonding, and she is currently in the process of producing a Korean dining table out of Hanji.

Mr. Kim, on the other hand, is the founder of Fermentation Architecture, a philosophy that links architecture with fermentation processes. He has designed a brewery called Boksoondoga, which is dedicated to the production of Makgeolli, the Korean rice wine. This is located in Ulsan, about 1 hour away from Busan, the second largest city in South Korea. It is a small family-run brewery that specializes in the production of authentic Makgeolli, the traditional unfiltered, fermented rice wine that is usually homemade and made with Nuruk, a Korean fermentation starter. Boksoondoga is based on the concept of revitalizing the villages to revitalize and increase rice consumption again.

Both architects inspired me a lot through their research and supported me in my research process.



- Hand made tea cup, lacquer made our of rice by products ash -
Pottery store, Ulsan



Street food, Pusan



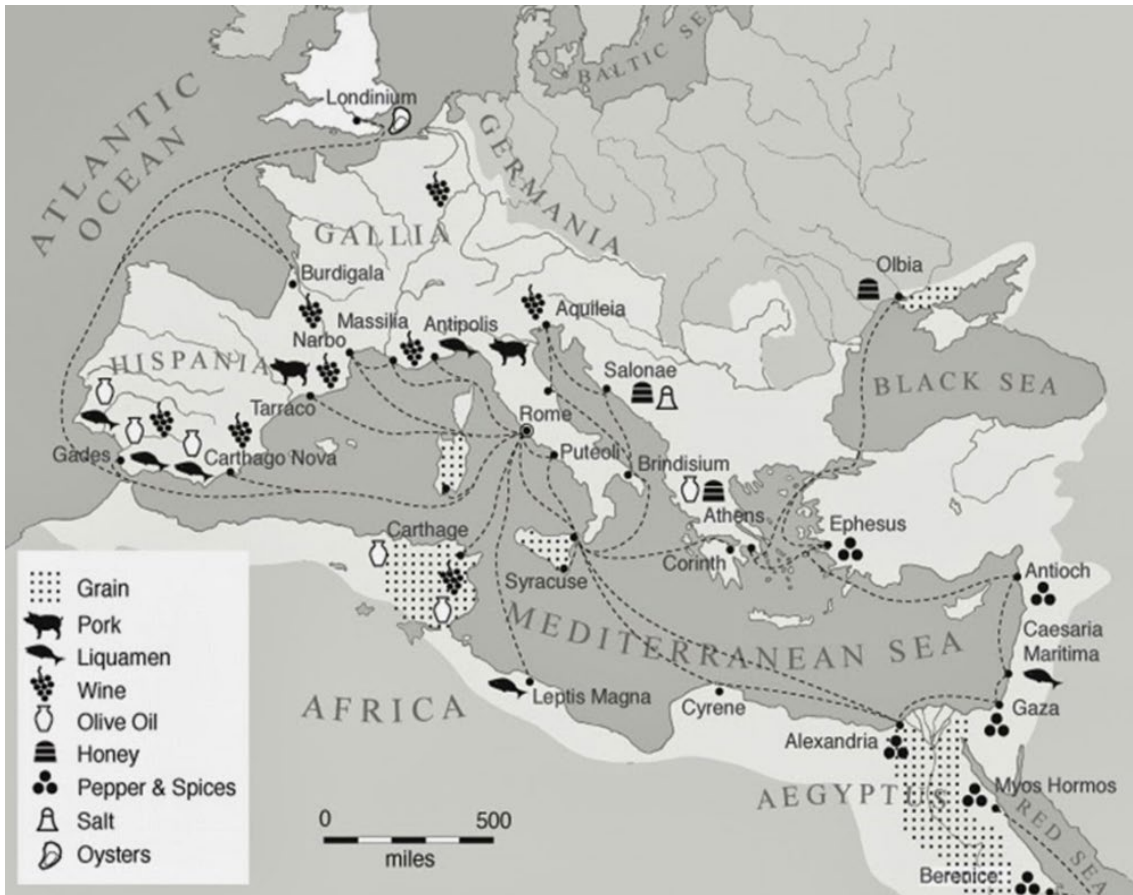
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RICE AND SOUTH KOREA



Harvest season

In the past rice has been identified as a value of richness. The wealth of a person was calculated with the amount of rice he owned.⁷ There are various terms to define rice before and after the processes or cooking phase. For instance the uncooked rice is called *Ssal* and as soon it gets boiled it is called *Bap*. But the definition *Bap* doesn't describe only the boiled rice since it is even commonly used to imply a general meal and so even its socializing aspect.⁸



Ancient Food Miles: the food supply routes of Ancient Rome

Food as a Principle of the Society

“Food is the ordering principal of cities shape”⁹

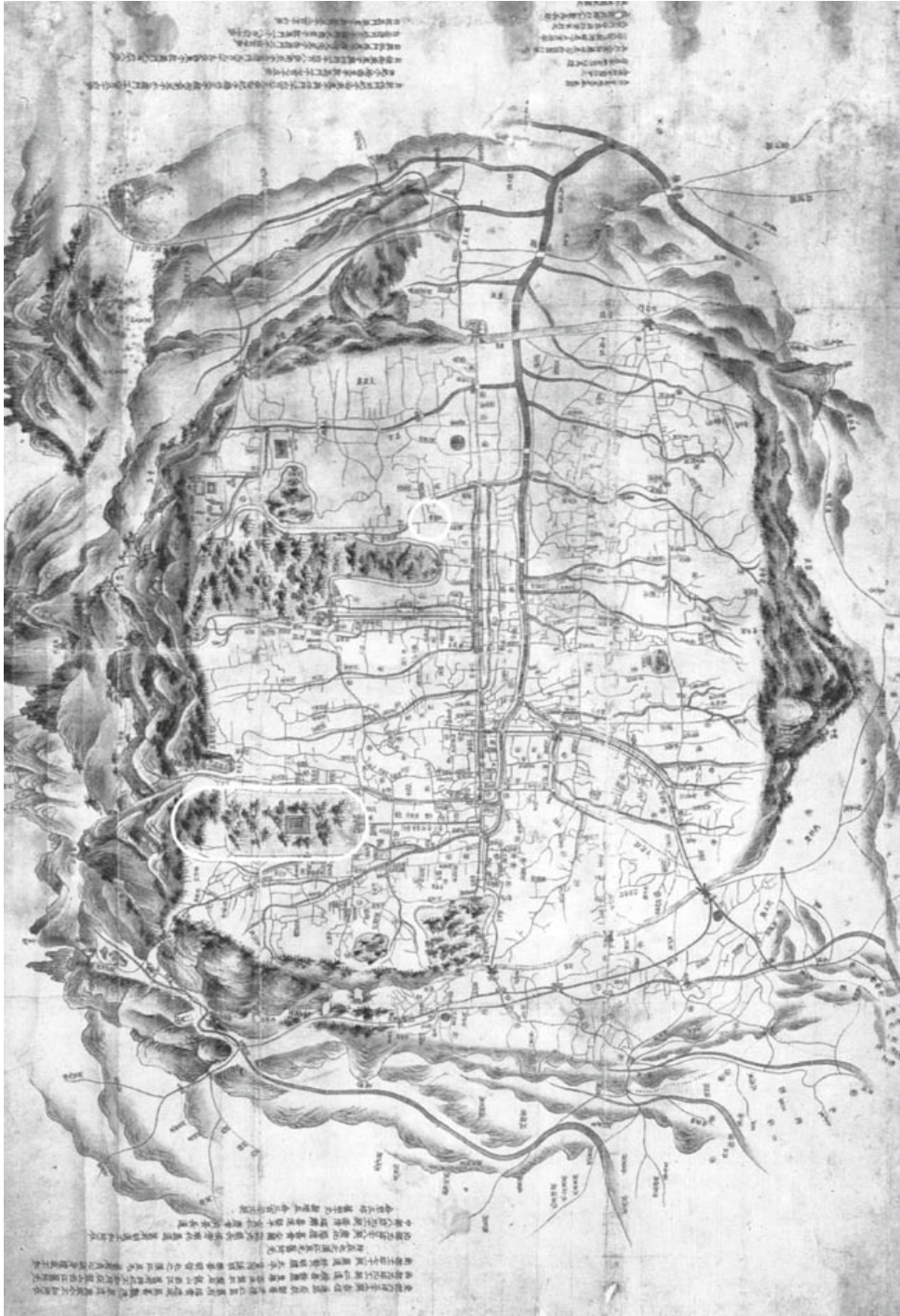
Food touches every area of our lives. It is one of the most significant characteristics of a culture, having the power to shape the world we live in. It defines our society, culture, and pleasure, and determines our relationship with nature. Moreover, food influences the size of space around us and finds representation in both, small-scale houses, and large-scale cities.

Food goes through a long way before being served on our dining tables. We often forget that most ingredients come from the countryside, in the best scenario, from the nearby one. However, it is not only about the course of the production process, but above all of the path to the consumer. The transportation network/system, which connects the production place to the consumer, was formed as early as 10000 years ago and counts one of the most formative factors of urban development.

Agriculture and urbanism are the two main fundamentals of our society and for all the permanent settlements. They are so dependent on each other that they define the other's existence, an existence based on balance and symbiosis. Moreover, the Latin word *cultus* means civilization as well as land cultivation.¹⁰

One of the most relevant examples for settlements enveloped by food/grain is the Roman Empire. Already in the first century AD the Roman population contained more than a million inhabitants and a very efficient food system was fundamental. So, the Roman empire started spreading its territory by “following their stomach and hunger”¹¹, to conquer new land according to the local agriculture offer. Thanks to the geographical position of Rome, it was possible to start very early with the import of agriculture products not only from all over Europe but also from all the cities located on the coast of the Mediterranean and Black Sea, called the “Ancient food miles”. Even though the term food miles first appeared in the 1990's, it defines a phenomenon that originated during the ancient Rome.

Rome was the first example of a consumption city, which was not based on self-sufficiency.¹²



Real painting of an urban landscape pattern in Seoul of the late oh 18th Century

History of rice in South Korea

The precise date of the origin of rice is still unknown, but historians guess that it started around 1000 or 2000 B.C., during the later period of Neolithic Age or early Bronze Age.¹³ Even though the origin is not clearly defined, surely rice has been one of the community shaping elements. Rice farming requires a big collective work, so people came together and created the first institutions. A relevant parameter in this case was and still is the water accessibility. So, the communities were split basically in two categories, the one with good water access developed the ruling class and one without water access in the other poorer class.¹⁴

Thanks to the development of iron farming tools and the increase of farming population, the production of this grain raised during the fourth century A.D. Those iron tools, such as axes, shovels, rakes, and sickles¹⁵ have played an essential role not only for the production but also in the setting of improved irrigation systems for the construction of dams and dikes.¹⁶ Although the usage of iron tools was just the start of a very long improvement path of rice cultivation. In the end of the Chonson period Koreans developed new systems such as transplanting and two-cropping method to achieve a better yield.¹⁷

Afterwards during the Japanese colonial between 1919-1945, the rice production continued to increase. The Japanese brought new methods and technology, for instance the usage of fertilizer and new varieties of rice, to implement the results but also to expand the rice production area.¹⁸ Even though the increasing yield, Korea could not feel those advantages since a large amount of rice was exported to Japan. In the post-liberation period (1945-1953) the rice policies have been reset and with the reform of return-land-to-cultivator, set by the government in 1948, it has been established that most of landowners could cultivate rice for themselves.¹⁹ This reform was a successful goal for the rice production in South Korea.

The green Revolution in Korea is a phase which follows the chronic rice shortage which affected the peninsula during the 50s and 60s. Thanks to a mechanization system in agriculture but also to the arduous work of researchers, cultivators and stakeholders, the rice yield increases widely from 3,920,000 t in 1966 to 5,210,00 t in 1976²⁰. After these fruitful phases, some historical events contributed to the yield decrease. For instance, the shift from land to city during the Industrialisation and urbanization, caused a decrease of the cultivation area. Moreover, the culinary trends have changed in time and the consumption of rice decreased. The global rice market has an important relevance on the inland markets. There is a big pressure from the big variety of the global rice market.²¹



Harvest season

Nevertheless, the rice tradition is deep in the Korean root not only from the nutritional point of view but also for the emotional link. Therefore, the Korean farmers are still fighting to increase its consumption and protect the inland market from the global competitors.²²

Time line:

2000-1000 B.C first trace of rice production and first farmers populations in Korean peninsula



100 B.C first introduction of iron tools for production



Later Chonson period (1392-1910) introduction of transplanting and two-cropping method



Japanese colonial period (1919-1945) implemented technology for more harvest output (introduction of fertilizer, new varieties of rice etc)



Land preparation



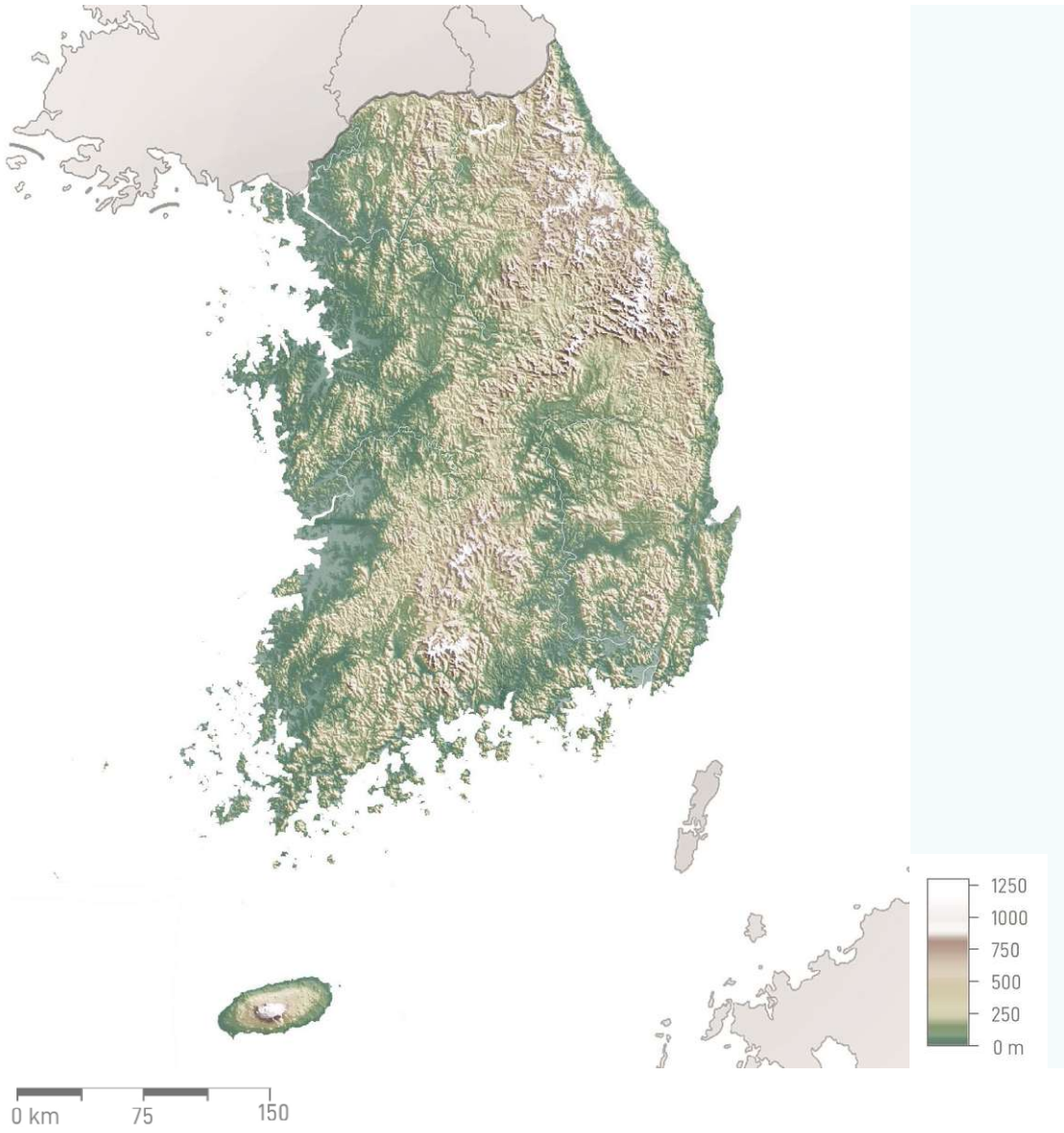
After harvest season



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RICE PRODUCTION IN SOUTH KOREA

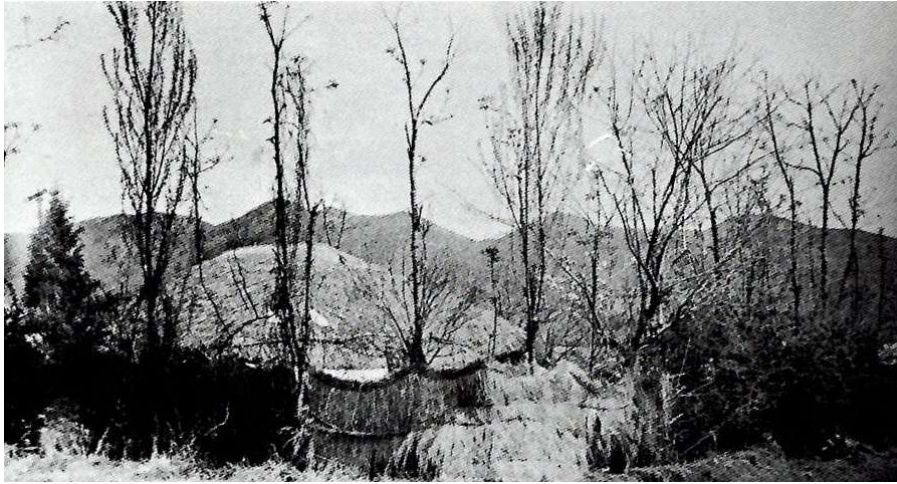
Topography Korea



Production

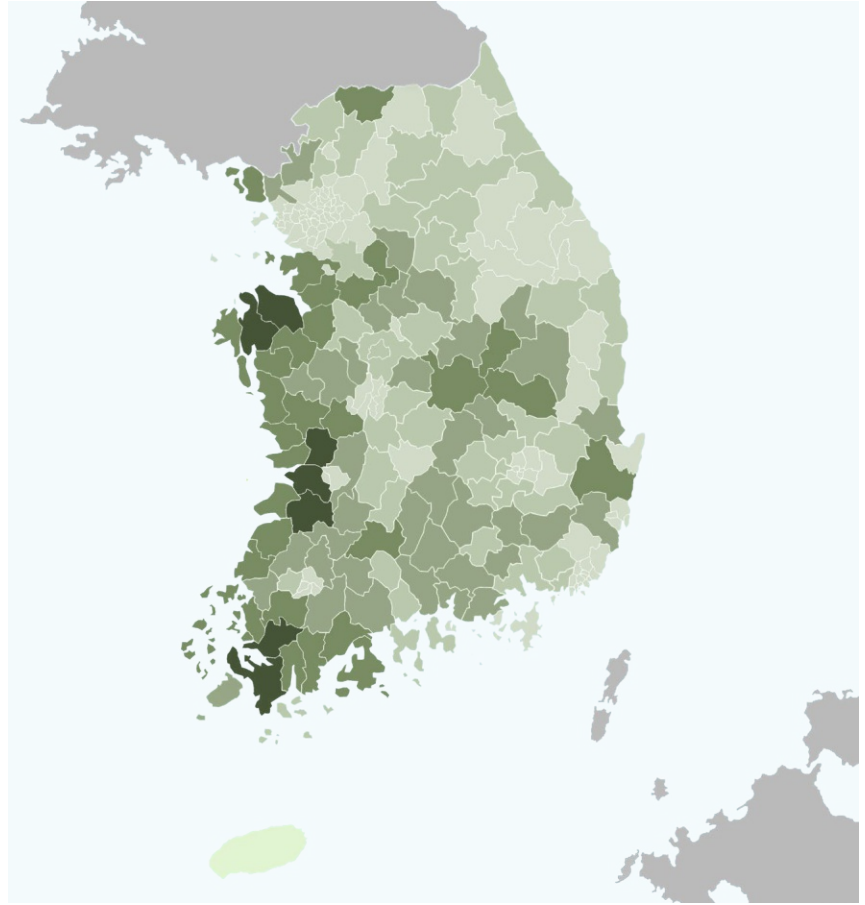
South Korea is characterized by four distinct seasons.²³ The climate of the peninsula varies widely between the different seasons. The winter is commonly very cold and with a lot of snow in comparison to the summer which can be extremely hot and humid. The temperature between the two seasons varies between 30-40°C in summer and the lowest temperature in winter is -15°C.²⁴

Rice is 90% staple grain production in Korea and feeds 60% of the global population.²⁵

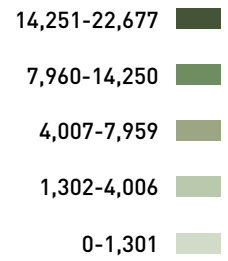


Hanok and Choga with straw fence

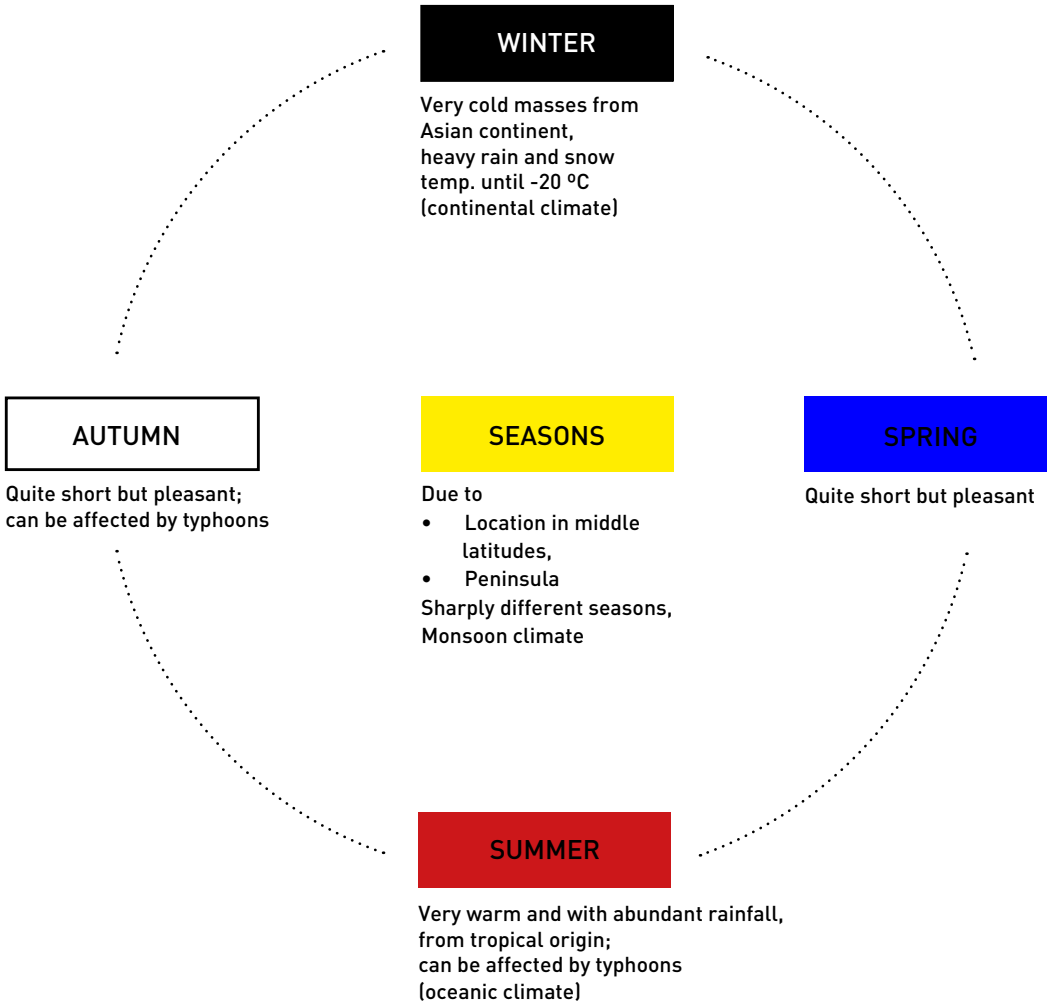
Rice cultivation area (ha)



Cultivation Area (ha)/ County



Rice production cycle



Pre-planting

The Pre-planting phase is probably the most important phase since its determinates the quality of the final product. This phase starts in Spring before the sowing phase and is fundamental for the organisation of the annual crop. The cure in choosing the rice typologies is fundamental and the first step. It will define the quality and taste of the final grain and in this sense even the economical parameter.²⁶

Seed quality²⁶

After the seeds are selected, they are subjected to numerous tests such as the varietal purity, seed viability and moisture content. Immediately after having passed all positively, they will be used for the sowing.

Crop Calendar²⁶

Setting up a crop calendar has several advantages. A good pre-calculation of the grain output will define not only the economical income but also the organization of the further work. It is basically set according to the climate condition of each year, that is why its varieties from year to year.

Land preparation²⁷

The land preparation is an essential part which permits the rice to be planted well. It helps the control of the weeds as well as the recycling of plant nutrients and crates a soft soil which is where the seeds will be sown. Usually, the land preparation starts around 3-4 weeks before the sowing. First, the filed needs to be cleared due to the residual of the previous harvests. Different methods are used for the clearing and preparation process such as tilling, harrowing the soil and levelling the field surface.²⁸

There are basically two typologies of land preparation, the wet one or the dry one. The choice depends on several factors such are the water access; if the soil is sandy or clayey and if the paddy is enclosed by bounds.

The advantages of a well-prepared field are, among others, that the rice has a fast, uniform, and abundant growth.





Transplanting Phase



Water channel

Growing

Planting

The sowing phase starts in South Korea at the beginning of May.²⁹ There are basically two possibilities to plant the seeds, by transplanting or the direct seeding. In this case it depends on the “locality, type of soil, rice ecosystem and availability of inputs and labour “.³⁰

It is important to choose the right time for the sowing, because this serves to get a better yield.

If case of using dry sowing about 60-80kg of seeds per hectare will be needed, whereas of the wet sowing only 40 kg per hectare.

Although the option of the transplantation requires some effort, because of additional tanks for the so-called nurseries and longer time for growth, the quality of the rice is much higher. The size of the nursery corresponds to 15-20% of the rice field.³¹

Water management

A fundamental element in the rice cultivation is certainly water. The fields are flooded for the first time before the sowing, and it is important that the field is irrigated regularly until 7-10 days before the harvest. For 1 kg of rice, you need about 1,400 litres of water. The irrigation starts with a 3 cm high water layer and increases to 5-10 cm.

The steps that are essential for water management are the following:

Step 1: Water channels

Since the rice fields in Korea are usually flat, it is important that the water is well spread in every paddy. Narrow channels are used to generate a well-connected and homogeneous water system. The water flows in these channels and through openings with the bounded field, the amount of water in the paddy can be regulated.

Step 2: Puddle correctly the field

In long break after the harvest and after the cold winter, it is common that cracks emerge in the soil. It is important to remove these cracks during the land preparation phase to prevent them from absorbing a large amount of water.



Byeo is ripening in September

Step 3: Uniform and bounded field

Continuously and well-levelled field save a large amount of water. Not only uniformity is important, but also good, isolated bounds are relevant to disperse unnecessarily quantity of water. Those bounds do not have only the purpose to enclose the field but also to avoid over-floating. For this reason, they should be at least 20 cm high.

Soil fertility, Weed management, Pests and diseases

After the sowing part it is important not just to control and regulate the water level but also the well growing of the grain. For instance, according to the colour of the leaves it is possible to estimate if the rice needs some fertilizer for a better growth. Even the prevention of pest and disease is a relevant factor which can influence the rich and healthy yield.



Harvest season

Post-production³²

Harvesting

After more than 4 long months of land preparation, sowing and growing phase, the grain around the beginning of September is ready for the harvest. The field turns almost completely yellow, and the rice is mature. There are several activities which are done during the harvest starting from the reaping of the mature particles to the separation of grain from straw from the threshing process to the cleaning process where immature non-grain part is removed.

Drying

Before being stored the rice needs to dry to prevent mould formation and be protect from parasites. The grain after the yield contains around 25% of moisture and in the best case the drying phase should start within the 24 hours after the harvest. Different methods can be used for the drying, from simple sun drying to machinery ones. The drying time depends on the length of the further storage period. The longer it needs to be stored the lower the moisture content should be.

Storage

After the rice is dried properly it is stored. Usually, the grain it still stored with the husk and will be milled later to protect it from parasites. Rice has a hygroscopic characteristic, which means that it absorbs the moister in the air. For this reason, it is important that the storage system is well isolated.

Milling & Processing

There are different steps to follow during the milling and processing phase to get an eat-able rice. The rice corn is stored with the husk, different layers as displayed in the image. The external layers can be removes either in one signal process or separately in order to extract every by-product individually for the further usage.



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RICE CONSUMPTION IN SOUTH KOREA





Korean lunch with Minkee



Magkeolli from Boksoondoga

Culinary rice tradition

In the past rice has been identified as a value of richness. The wealth of a person was calculated with the amount of rice he possessed.³³ For South Korea rice is the most valuable grain in consumption but also the by-products for the hand craft traditions. During my trip to South Korea, I was able to understand the meaning of this rich full grain for the country, especially the culinary tradition. I was also able to understand how deep the meaning of rice for the population is starting from the definition itself. There are different a terms to define rice before and after the processes or cooking phase. For instance the uncooked rice is called *Ssal* and as soon it gets boiled it is called *Bap*. But the definition *Bap* doesn't describe only the boiled rice as it is also commonly used to imply a general meal and so even its socializing aspect.³⁴ Despite the specific terminology of the preparation of rice, rice is present in every Korean meal and also defines the end of it; until there is still rice in the bowl the meal is not ended. Commonly the table set has a rice bowl on the left while soup is placed on the right and all the side dishes are positioned in front.³⁵

Tteok, the traditional rice cake is present during the entire life of the population. It is used to prepare *Tteok* as a symbol for life events, for happy ones and for tragic moments, from birth to death. That is why there are several types of *Tteok* according to the ingredient's options of the seasons. Seasons play an important role in the Korean tradition, not only in terms of agriculture but also the activities that symbolize each season. For instance, rice cake soup is commonly eaten on New Year's Eve as a symbol of a good new start. In the past rice defined the wealth of a person, the more rice the individual possessed the richer the family was.

Traditionally during a typical Korean meal all the dishes are served at the same time. Sharing is a very important characteristic of the Korean dining and it is the staple of all the meals. But mostly there is just one dish which is served separately, the rice.





Magkeolli bread



Magkeolli fermentation room in Boksoondoga

The culture of Korean food varies a lot according to the distinct season. Therefore, the Korean cuisine is pretty defined by the seasonal ingredients. But there are also some dishes like the commonly served *Banchan* (side dish)³⁶ and rice which are an everyday consumption. The most famous *Banchan* is *Kimchi*, a healthy side dish made of spicy fermented vegetables, mostly *Napa* cabbage or white radish. *Kimchi* is together with rice one of the dishes which belongs to the Korean identity.

There are different types of traditional table setting in Korea. In common all these types have the rule of serving all dishes together. The *Bap-sang* is the regular dining table setting where cooked rice is the main dish.



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VERNACULAR ARCHITECTURE





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Madang



Map of Seoul, 1840 AD

Vernacular Architecture

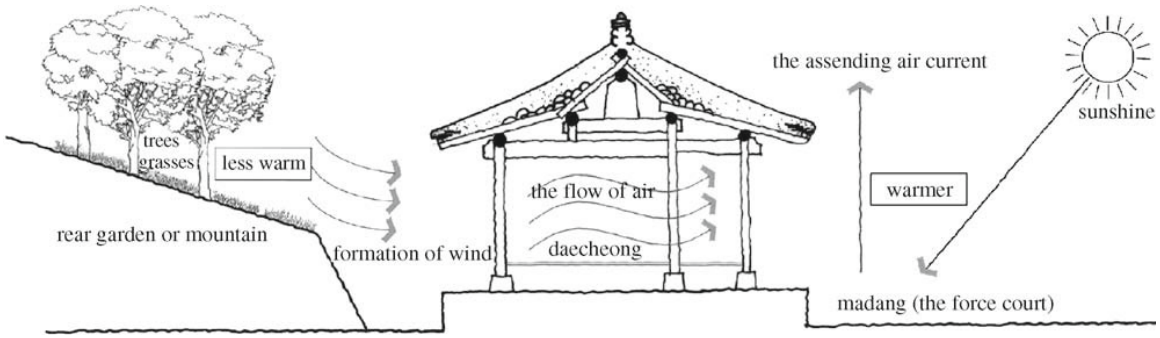
Nature is the dominant element in the vernacular architecture of South Korea. It is about the relationship with the natural environment in a controlled way based on the respect for nature. Do-Kyoung Kim from the Department of Architectural Engineering of the Korea University in Seoul states out the very evidence “that architecture has been losing its ability to coexist with nature”³⁷. In the past century, the human being shaped architecture without placing the natural environment as a fundamental element and its respect as a priority. There are several high graded characteristics that define the Korean vernacular architecture, such as the approach with wind and sunlight.

Pungsu jiri

The *Pungsu jiri*, the Korean Feng Shui, is a geomancy which is deeply integrated in the local architecture. It connects “the life-force energy and its surrounding”³⁸ and is a “practice based on the idea that our homes are a mirror of what’s happening inside us”. *Pungsu jiri* defines from single elements placed in the room, to the orientation of the entire building. According to *Pungsu jiri*, the

entrance area is the most important place in the house, since it is where “Gi”, the main life force², enters. It is a positive living energy, and therefore the entrance area should be kept as tidy and free as possible so that “Gi” can enter the house more easily.³⁸

But the *Pungsu jiri* is not only relevant in the interior since the main influence is on the orientation of the building, according to the site elements, especially rivers and mountains.³⁹ These two are essential elements since they are an important source of water and steer wind. The main idea is that architecture should harmonize with nature so much as to merge with it. For this reason, the constructive elements of the vernacular architecture are the consequence of the maximum profit from nature.⁴⁰ Even in the conception of cities like Seoul, it is possible to recognize the geomancy.



Concept of ventilation by convection current in summer



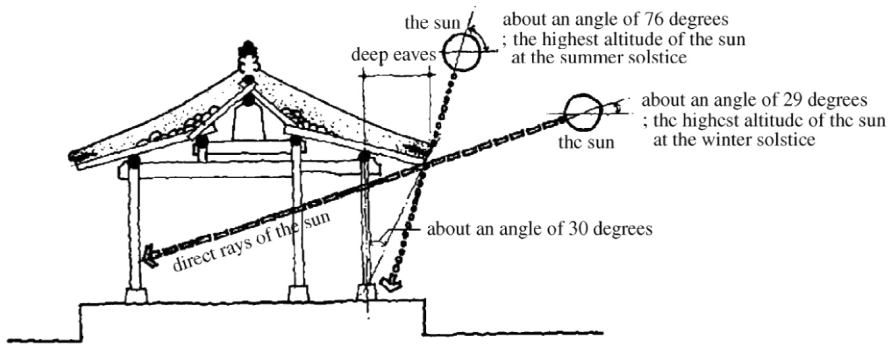
Open Maru

Natural ventilation system

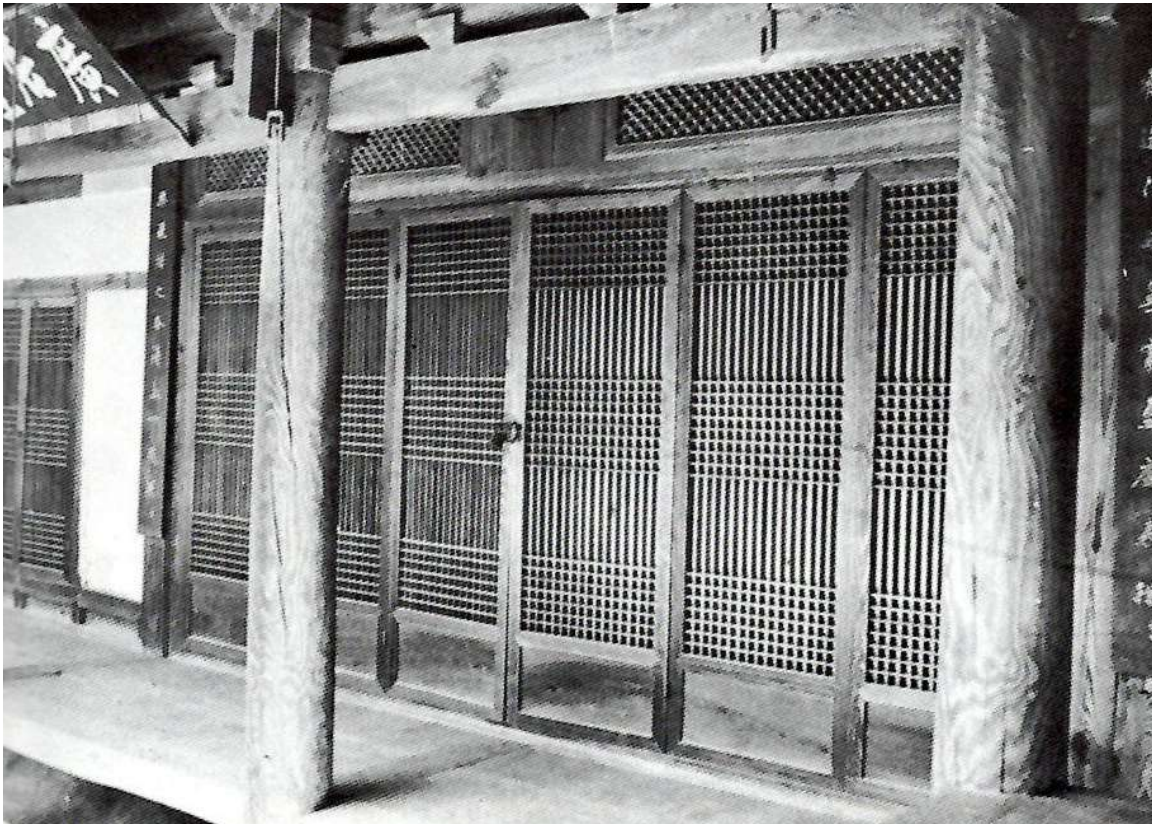
The four seasons in Korea are sharply different from each other. There is a very large difference in temperature during the year, which forces the architecture to react to it. The topography of the country is very mountainous, but this serves to ensure that the wind load can be well directed.

The strategic location of the traditional architecture at the foot of the mountains allows good wind control for the warm summers, but at the same time is a good protection from the cold in the winter months but also from the typhoons that are very common on the Korean territory.

In summer, temperatures can reach 30-40 °C and the climate can be very windless⁴¹. For this reason, it is important that an efficient ventilation method is integrated into the architectural concept. A relevant element of the *Hanok* is therefore the *Madang*⁴², a small courtyard from which the *Hanok* is accessed. It is important that the *Madang* is always empty and left as free as possible so that the facade can be opened during the hot months by achieving an optimal ventilation through the building.



Functions of the eaves in Korean traditional architecture



Daegu, closed hall with six doors

Natural lightning system

There are several elements which allow the traditional architecture to achieve the optimal natural lighting. The most important is probably the roof. It is an outstanding roof, and the angle is defined by the summer and winter sunlight angle. By taking the façade as the vertical reference, the deep eaves are defined, in the case of Seoul, by 76° , the maximum altitude of sun radiation in summer and 29° in winter. During the winter, the sunlight rays are very deep and can illuminate most of the ground floor.

Furthermore, the *Madang* plays an important role for the lighting, as due to its complete emptiness the sunlight reflects on this forecourt. The ceiling of the interior is mostly covered with light-colored materials, mostly Hanji⁴³, the Korean paper. The sunlight that shines in the Mandang is reflected on the interior ceiling, which in turn reflects the light in the room. This spreads an indirect but very effective lighting system



Opened bunhap-mun of a Korean traditional house (Haksajaein Gangwha, 2000)

Flexible ground floor

The flexible floor plan permits on the one hand a good air circulation, on the other an adaptable division of the floor plan. By dividing the floor plan into smaller rooms, it is enabled to keep as much heat as possible, a huge advantage for the cold winter months. On the other hand, in summer it is possible to keep the floor plan open to achieve the best air circulation. The floor plan of a *Hanok* is divided as follows.

The term *Daecheong*⁴⁴ defines the central room, with adjoining rooms on both sides. Thanks to mobile elements such as the *Bunhap-mun* (bunhap = folded; mun = door)⁴⁵, a system in which the doors are folded upwards, it is possible to enlarge the *Daecheong*. Not only the interior partitions are flexible according to climatic conditions, but also the windows, *Deot-mun*⁴⁶, are construct with a multi-layer system. By opening and closing the individual layers, the influence of sunlight and the thermal insulation can be controlled.



Anchae, women house, in Jeollanam-do

Roofs

In the past it was used for the roof construction since it is an excellent isolation. *Choga* roof⁴⁷ is a typical Korean straw roof, it consists basically of a wood structure, with a layer of earth, followed by a layer of clay and grass and an overlayer of rice straw held by a grid net of rice straw rope. The advantage of such roof typology is that the wood support structure can be thinner than the one of a tile roof used by *Hanoks*. On the other hand, the outside shell is very flammable and not that resistant as clay tiles. For this reason, the straw layer is commonly replaced with new straw every year after the yield.

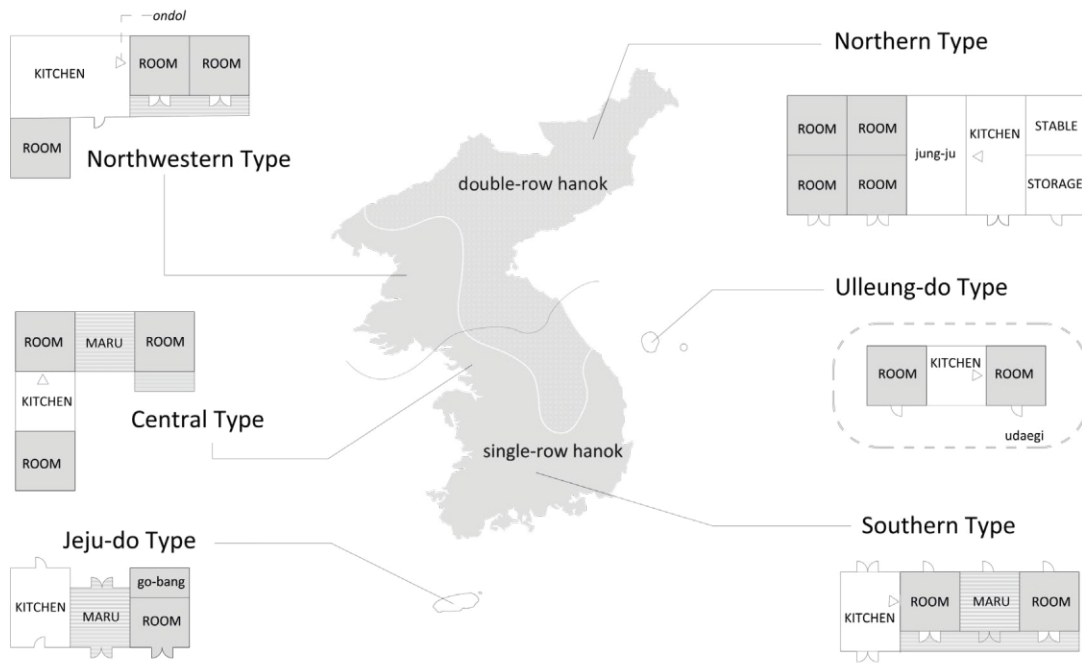
But rice straw isn't just commonly used for the walls. In this case rice straw has been mixed with clay and water boiled with seaweed to construct walls. Water cooked with seaweed not only makes the wall waterproof but allows the transit of stale air and humidity to the outside.

Seen as a very characteristic feature, *Hanok* walls are plastered in such a way that the timber structure remains visible. Three layers of mud are attached on both the inside and outside. For the under-most coat on the inner side, known as *Chobyek-bareugi*⁴⁸, mud, sand, and finely chopped straw, which prevents cracking, are mixed with water and then applied to the lath work. The same is then done on the outer side, *Matbyeok-bareugi*⁴⁹, but with less straw added to the mix, in order to enhance adherence to the inner layer. These first layers are then topped with a second one, *Jaebyeok-bareugi*⁵⁰, these mixes use finer sand and smaller pieces of straw. As the last step, the walls are finished with setting plaster, *Jeongbe-ol-bareugi*⁵¹, which comes in three types.





House at the foot of mountains (head residence of the Uiseong)



Hanok typical floor plans typology

Hanok Floor plans

In the vernacular South Korean architecture, the kitchen was located in most of the cases on the outer part of the floor plan. This can be explained historically since the kitchen has always been a place for the housekeeper and servants, so it was important to be accessible from the outside. The following image shows the collocation of the kitchen in the floor plan according to the region.

Moreover the kitchen's scope wasn't just for cooking, but considered the fundamental heating function. This system is called *Ondol*⁵², and it is one of the most unique invention of the Korean architecture. The kitchen is set a few feet lower than the rest of the rooms, with the aim to create underfloor canals which are used for the efficient and ecological heating system. As displayed in the section, the fireplaces in the kitchen, called *Agungi*⁵³, are connected with the underfloor of the adjoining rooms. So during the act of cooking the hot air is directed in the underfloor and heats the floor.



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ICHEON RICE FESTIVAL





Icheon Rice Festival, dancing performance



Rice trashing at the Icheon Rice Cultural Festival

Icheon rice festival

Icheon is a small city located in the region of Gyeonggi and counts to one of the most famous location for rice production in South Korea. 9,500 hectares are cultivated and permits to reach an annual yield of approximately 45,000 tons of rice.⁵⁴

Jachea rice is the most popular local rice and refers to a “early rice”⁵⁵ rated with a high quality. It is a typical local rice which has specific characteristics such as the early harvest maturity, the presence of arista, specific colours during the different growing stages and it requires a fertile earth.⁵⁶ Its typical colour is bluish white and it is oil rich.

Fertile land, the geographical location and optimal weather conditions⁵⁷ are the factors which elevate the grain quality. The topography of the Gyeonggi region, situated in the inner land of South Korea and lying in a basin, makes it possible to protect rice paddies from typhoons, which is one of the biggest enemies of agriculture. The region has a good groundwater access which is rich of magnesium, a fundamental element for gaining a better taste of the grain.⁵⁸

Moreover, thanks to the well exposure to long sunlight and the big difference of day-night temperature a high qualified rice can be achieved. According to Yoo Sang-gyu, director of Icheon’s Agricultural Technology Service Center, the temperature difference allows the soil to maintain the nutrients and creates a perfect circumstance for the rice growth.⁵⁹ The soil permits a perfect nourishment due to a suitable balance of clay and sand in the ground.

Incheon’s rice has been known since the Joseon Dynasty and reported in the agriculture books since 1491.⁶⁰ In the past this area was popular for the cultivation of rice for the royal family, from it derives the term Geumsang (Jinsang) Ddaraegi, which refers to the specialized range of the land to cultivate rice for kings.⁶¹

Close to the center of Icheon there is a small village, Seolbong Park, settled on the cost of the Seolbong lake. Nowadays this village is famous for hosting a big rice festival, which is held annually after the harvest, the Icheon Rice Culture Festival. The festival takes place in October and it is a celebration of rice,



Traditional rice cooking

remembering all the different kind of cultural relationship to rice. Therefore, the park is divided in different zones, which host a huge variety of activities related to rice. The Festival is not only for the locals but especially for tourists. It is the perfect situation to learn a lot about rice and how present this grain is in the people's life.

The activities vary from parades and traditional dances correlated to the rice harvest festivity to processing of the by-products and culinary events. There visitors can learn and experience all stages of the rice life-cycle from the traditional farming culture of the older farmers to the consumption of the final product. The most famous activities are for instance the rice trashing and the modelling of design objects out of straw like mats, ropes, and shoes. But also, the preparation of a 600m rice cake⁶² belongs to the highlights. One factor connects all the activities together and it is the teamwork experience which is fundamental for the rice cultivation.

Not only the dishes represent the rice but also the lyrics of traditional folk songs which are played during the festivity, for instance “Banga Taryeong” and “Jajin Banga”, songs which tell the story of this area and how it was used to produce the rice for the kings.

Musical festivity take place with “Pungmulpae” performances, a traditional trope played during Korean folk music events. In the past it was common to play this instrument to motivate the farmers during the land work. Nowadays it is not common anymore, but it is still traditional and is always a present instrument during the different events of the Icheon Rice Culture Festival.⁶³



A field of rice before the harvest stretches across farmland at Buraemi Village in Icheon , Gyeonggi Province

Zones at the festival⁶³

Neighborhood Zone: Opening Ceremony location

Play Zone: Activities related to farming culture, such as traditional hand-craft

Prayer Zone: Prayer ceremony for a successful harvest and to pray for good health and longevity Rice Cultural Festival

New Rice Marketplaces: Market to promote Icheon Rice and to sell newly produced rice and other agricultural products

Culture Zone: Open folk performances to provide a better understanding of farming culture, such as straw craft competition, folk games, weaving straw bags

The Tavern: Gastronomy area to enjoy food and drink, mostly rice based dishes and drinks, such as *Soju* and *Makgeolli*

Rice Café: Gastronomy and cooking school area. 2000 portions of rice cooked in an iron pot and rice dishes competition, making half-moon-shaped rice cake for foreigners, Icheon rice cooking competition, rice wine sampling

New Rice Street: A street filled with attractions including carriages and interesting photos, dragon tug-of-water. Place for street parade, dragon tug-of-water, making five-colored long and slender rice cake, carts for children, etc.

Fairy Tale Zone: A venue for children to enjoy various festival activities to create special memories. Preschool play, traditional play experience, rice threshing experience, rural experience

Good Harvest Zone: A cultural venue to show and experience traditional culture such as turtle play, with a big rice straw turtle. Where it is not only for entertainment and festive functional, but it symbolizes the wish for a property yield in the village. the turtle performance is accompanied by a *Pungmul* performance, traditional Korean music performed by farmers

Agriculture zone: possibility to cultivate rice in the nursery stage



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"CRADLE TO CRADLE" SYSTEM WITH RICE BY-PRODUCTS



Rice By-products

Rice straw

Rice straw is the first result of the by-product after harvesting phase. Out of each kilogram of milled rice, it is possible to get approximately 0.7 to 1.4 kilos of rice straw.⁶⁵

The rice straw is also known to be a lignocellulosic biomass, which means that it contains three primary components such as lignin, cellulose, and hemicelluloses.⁶⁶

In South Korea, the burning of rice straw is seen as a symbol of a successful harvest, although this process damages the climate since it increases pollution and contamination.

Regarding the usage of this material, rice straw is normally braided and used to produce items such as baskets, carpets, and paper. Moreover, it also contains a high quantity of Silica, a thermally stable component that is easily compatible with other materials and has very useful qualities in both fields of chemistry and physics. Besides, another interesting fact about Silica is that it does not rot.⁶⁷



Rice husk

The rice husk is the hard-exterior layer of the rice seed which is an important element since it protects the grain during the growing phase. From 1 kg milled rice it is possible to extract 0.28 kg of rice husk and it is rich of silica and lignin. After the first milling process it is possible to reuse the hull in several ways, for instance its ash can be applied in construction as a supplement in cement and steel. When carbonized, rice husk is used as a fertilizer.⁶⁸



Rice Bran:

Rice bran belongs to the rice by-products which are being discarded during the milling process and there are different types of bran depending on the stage of milling process. From 100 kg rice paddy it is possible to extract 5-10 kg rice bran. The milled powder contains a multiple substance like protein, fat, ash and crude fibre¹ and is a well-known source of Vitamin B and E. Those are not the only values of rice bran since 10-23% of it is oil. In the past the extracted oil has been commonly used as a ligature for animal feeds. Nowadays thanks to the advanced techniques it is even used as a dainty cooking oil as well as applied in form of wax in the cosmetic industry.⁶⁹



GAIA, Rice House in collaboration with WASP 3D; 3D printed house out of Rice by-products materials

*Ricehouse*⁷⁰

The problem of wasting rice by-products is very frequent worldwide. Italy produces the largest amount of rice in Europe⁷¹ and has a huge quantity of waste of the by-products. The Start-up *Ricehouse*, founded by the Italian architect Tiziana Monterisi, started to question about the afterlife of the by-products of rice production, since they have several valuable construction characteristics. The aim is not only to find a usage but also to develop an architecture concept which has a minimal to zero impact on the environment. As a solution *Ricehouse* developed several smart construction products, enabling a major step forward for green building.

The products of *Ricehouse* are almost biodegradable and are developed as possible with the “waste” of rice production. Thanks to the silica contained in straw and husk those products are very resistant to humidity and parasites. Moreover, they offer an amazing acoustic and thermal isolation.



RH 100

Products of *Ricehouse*⁷²

RH 100, Isolation plaster

RH 200, Finishing plaster

RH 300, Lightweight screeds

RH 400, Clay based coat plaster

RH 410, Finishing plaster mixed with clay

RH 500 Eco paint of rice bran

RH 600 Thermo-acoustic insulation panel of rice husk

RH 700 Husk and Clay Panel

RH-P Compressed natural straw insulation

RH-L Natural rice husk for insulation



RH 400

RH 600





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SOUL FOR SEOUL

Site







Site

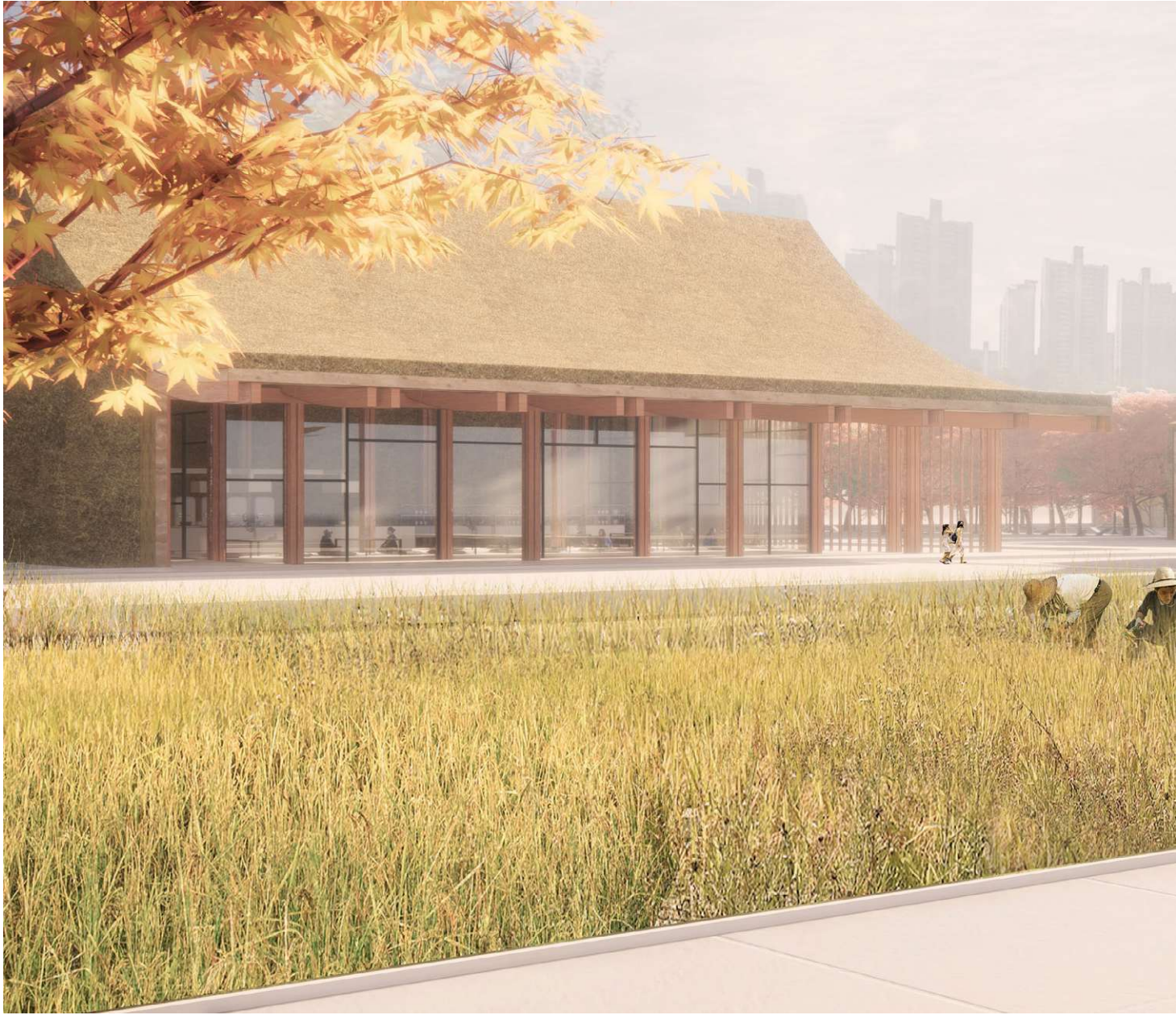
The project is located in the southern part of Seoul, in the middle of the Jamsil's Hangang Park, directly on the east of the Han River (even called Hangang). In the immediate proximity there are attractions such as the Olympic Stadium and Lotte tower. The selected site belongs to a long sand strip directly on the Han coast, which is now on new development with the aim to generate a leisure area for the inhabitants but also for the tourist. The site is now without a definite use, it is bordered with a water call taxi boarding point and by the Jamsil Hangang swimming pool area. This latter is now on a new development process, and this year the Seoul Metropolitan Government established competition for its new design.

Furthermore, it is an area with a constant flow of people. A high traffic highway separates the riverbank strip from the residential area. Therefore, a big issue of this site is the bad connection of the residential part with the riverbank. According to the current competitions, this strip is aimed to generate an environment friendly area taking in consideration the relationship with the water and ecology. Other focus points are to create a human-centered cultural leisure area but at the same time keep it a nature friendly spot in the middle of a metropolis.



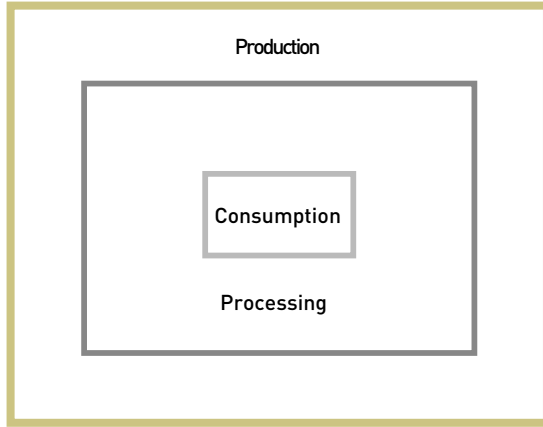


Siteplan M1:1000

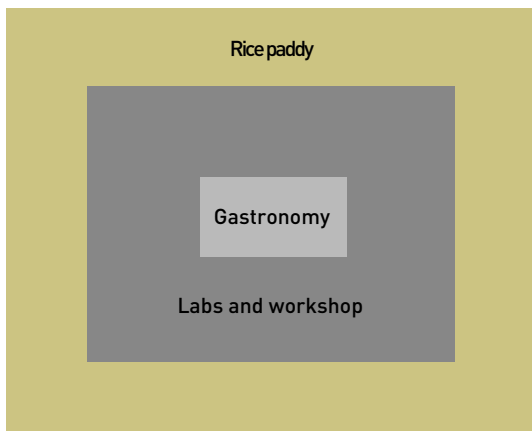




Rice paddies and public spaces



Rice cycle



Soul for Seoul structure

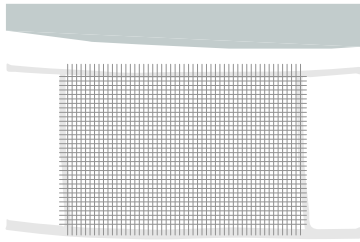
Didactic Concept

Soul for Seoul is an urban didactic village placed in the middle of the heart of the South Korean capital. The aim of the project is to bring the visitors through the production cycle of rice. To achieve this the Masterplan is organized with a layer's methodology. Those layers represent the life cycle of rice, which is divided in PRODUCTION, PROCESSING and CONSUMPTION. The external layer is the production and the central is the consumption. Thanks to this system of arrival to the consumption layer, the visitors need to pass the previous steps, production, and processing. In this way Soul for Seoul generates a didactical path system which is well integrated in the landscape.

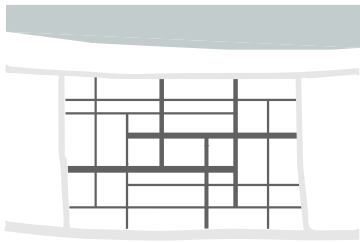
The first layer the visitors encounter by arriving from every direction is the rice paddy. The rice paddies surround the whole areal, allowing the visitors to have immediately a close approach to the grain plant.

In the second layer, the processing, are placed all the functions that belong to the phases following the harvest. Here every by-product of rice gets importance through an assigned house. Straw, Husk, Clay are the fundamental by-products which are used in the Korean tradition for buildings and hand-craft. In the houses of the processing layer, it is possible to find laboratories and workshop spaces to process and work with the by-products.

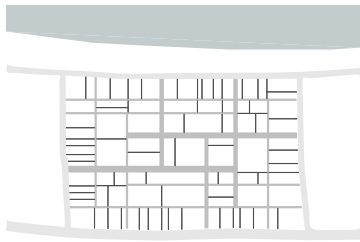
After having crossed the Production and Processing layer, the last layer, the Consumption area is reached. where a restaurant is situated. This Gastronomy is specialized in rice traditional recipes with the local cultivated rice.



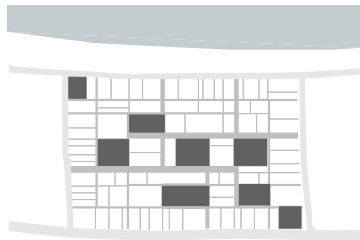
Step 1 : *Kan* grid



Step 2 : Path system



Step 3 : Hierarchization of fields



Step 4 : Place architecture



Step 5 : Leisure spots in paddy

Concept Masterplan

The concept of the Masterplan is set in different steps, which together creates a small urban village.

A grid of 1,8mx1,8m is the first step. The measure is emitted by the Korean unit of measurement *Kan*⁷³, which is traditionally used in Korean architecture to define measure like the distance between the pillars or beams. All the sizes of fields, paths and buildings in the project are defined by *Kan*.

As a next step the paths system is set. The paths have different widths according to their function but are always factors of *Kan*. Generally, the whole areal is a car free area but the widest paths enable delivery.

The third step is the hierarchization of the big plazas between the paths. Small gaps between the ground pavement refine the picture of the master plan from the top view.

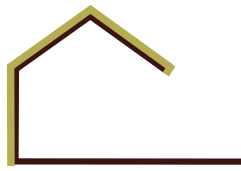
After this subdivision singular buildings are places in the spaces which constitute the architecture of the village.

As a final step small leisure spots are set in the Rice paddy to create urban spots for chilling and resting under a cherry tree.





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Hull, wood structure
and rice straw facade

+

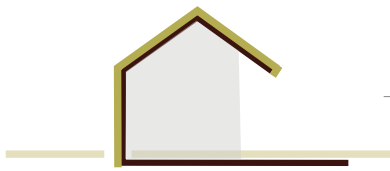


Transparency

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Conceptual
section



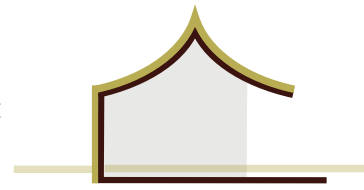
Conceptual
section

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Hanok roof shape

=



Final conceptual
section

Architectural concept

As by-products cover and protect the rice corn, so do they with architecture.

The architectural concept of Soul for Seoul is first the modern variation of the vernacular Korean architecture. As explained in the previous chapter it is used to cover *Hanok* with a straw layer to protect the building. This layer needs to be changed after every harvest, but it is a Korean symbol of architecture changing with the nature. The houses of the village of Soul for Seoul have a wood structure which is covered by a straw external layer. The interior is almost transparent thanks to a glass facade and inner walls, creating the possibility to see through the entire house.

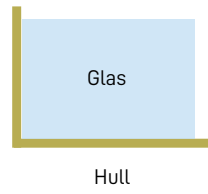
As a second step the beams structure of the roof are curved, thus reminding the shape of the traditional *Hanok*.



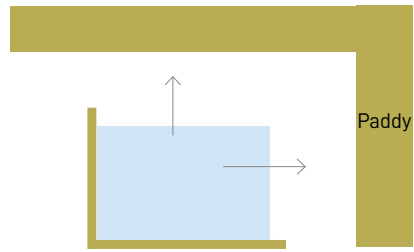
Typical Choga in Ulleung-do with double facade

Thatched straw as external layer





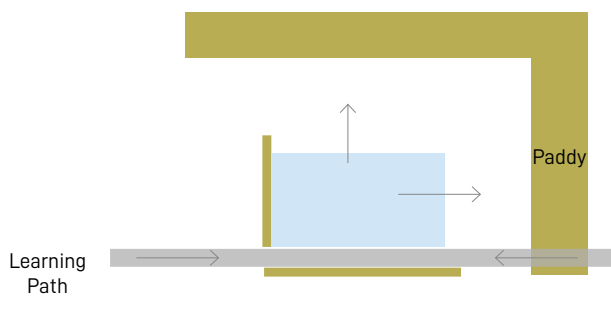
1) Straw hull on transparent interior



2) Open to Rice paddy



3) Learning path crosses building

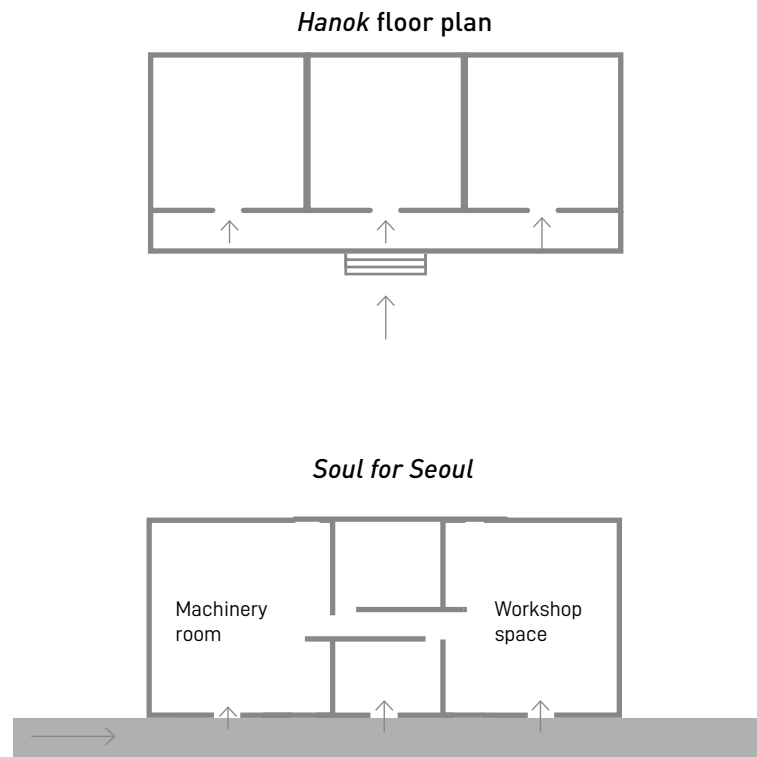


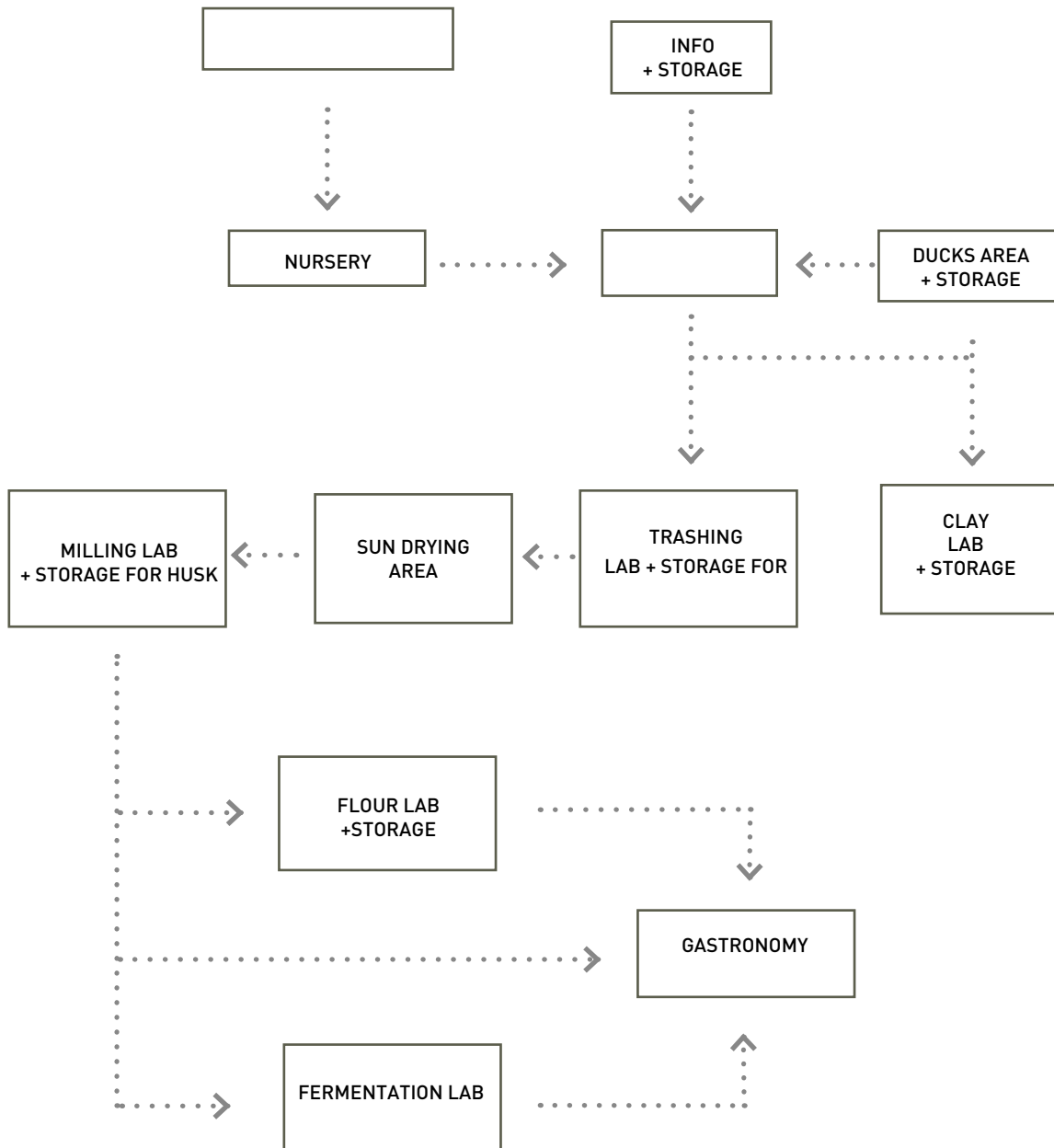
4) Final floor plan concept

Concept floor plan

In the floor plan it is possible to see the L-Shape Straw façade. Every house is open in two direction, this permits to always have a direct view on the rice paddies. Moreover the “learning paths” cross the house leading the visitors directly inside the houses. In this way the visitors pass the different steps of the rice production life cycle.

The floor plan is a new interpretation of the traditional *Hanok* floor plan. Usually in the Korean vernacular architecture it is used to step on a stone before entering in the house. From the external corridor it is possible to enter in every room. The traditional corridor is replaced with the learning paths in Seoul from Seoul. From the path it is possible to enter in each room.





Space program

The space program is based on the production, processing, and consumption steps. Starting from the seed lab where the seeds are tested before the sowing stage in the nursery. Afterwards they are transplanted in the paddy where the grain can continue growing until the harvest.

In South Korea it is very common to use ducks, which eat the pest from the grain during the growing period. After the harvest, the rice is threshed and removed from the first by-products, the straw. Then the grain needs to dry in the sun and afterwards it is milled where the husk is leftover. Every one of those by-products has its own house with a machinery, storage, and lab room where it is able to continue to use these valuable materials for hand-crafts.

In the next step the milled rice is stored in the Flour lab, fermentation lab and in the gastronomy, there rice is processed in form of rice flour, fermented rice-based drinks or cooked in different ways by the chefs of the restaurant.

Thanks to the path system the different functions are connected to each other. The graphic shows the different connections.

Quantity of a annual harvest

		LAB	STORAGE
Seed lab	.....> 200 m ²	170 m ²	30 m ²
Ducks	.....> 50 ducks	Garden 130 m ²	50 m ²
Rice	.....> 3.900 kg	Gastronomy: for 60 people 350 m ²	40 m ²
Rice flour	.....> 1.000 kg	200 m ²	15m ²
Rice fermentation	.....> 1.000 kg	200 m ²	15 m ²
Straw	.....> 3.900 kg	300 m ²	60 m ²
Husk	.....> 1.170 kg	200 m ²	15 m ²
Clay	.....> 150m ³	200 m ²	30 m ²

Rice as the unit parameter

As a further didactical aspect, the size of every house is set by the quantity of the respective product which is produced locally. For instance, for every kilogram of rice it is possible to get one kilogram of straw. Through a space calculation the straw house is big enough to store the annual straw and have enough space for workshops and machinery. With this system all the sizes of each house have been established. This needs to spread a sense of quantity of waste during the food production phases.

TOTAL AMOUNT (for a annual production cycle)

Paddy area	.....→	7.500 m ²
Rice total amount	.....→	3.900 kg
Water	.....→	33.000 m ³





View in Restaurant





Site Riverfront

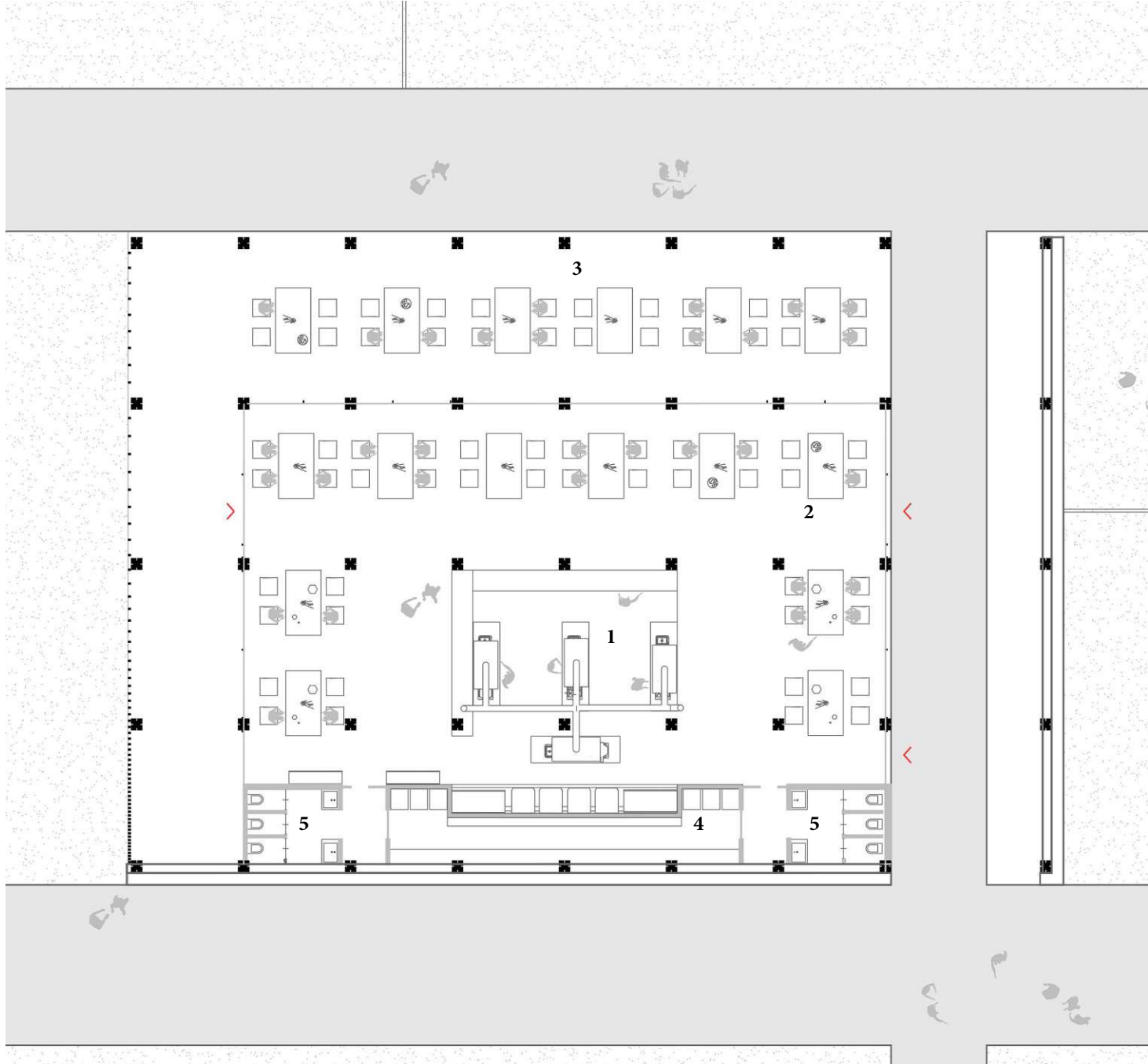
Floor plan Masterplan



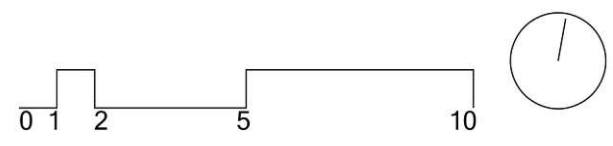


- 1 Seed lab
- 2 Nursery field
- 3 Rice paddy
- 4 Ducks house
- 5 Clay lab
- 6 Straw lab
- 7 Husk lab
- 8 Rice flour lab
- 9 Fermentation lab
- 10 Restaurant
- 11 Information
- 12 Garage and trash

Floor plan Restaurant

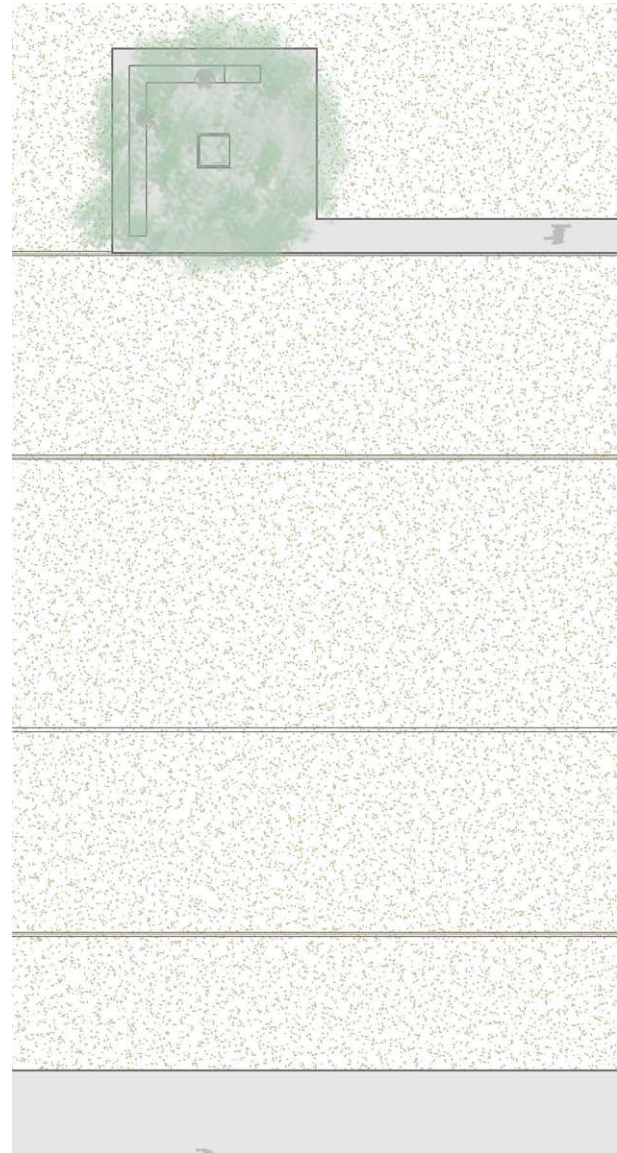
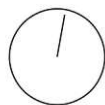
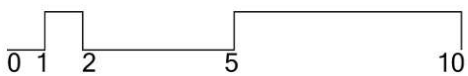


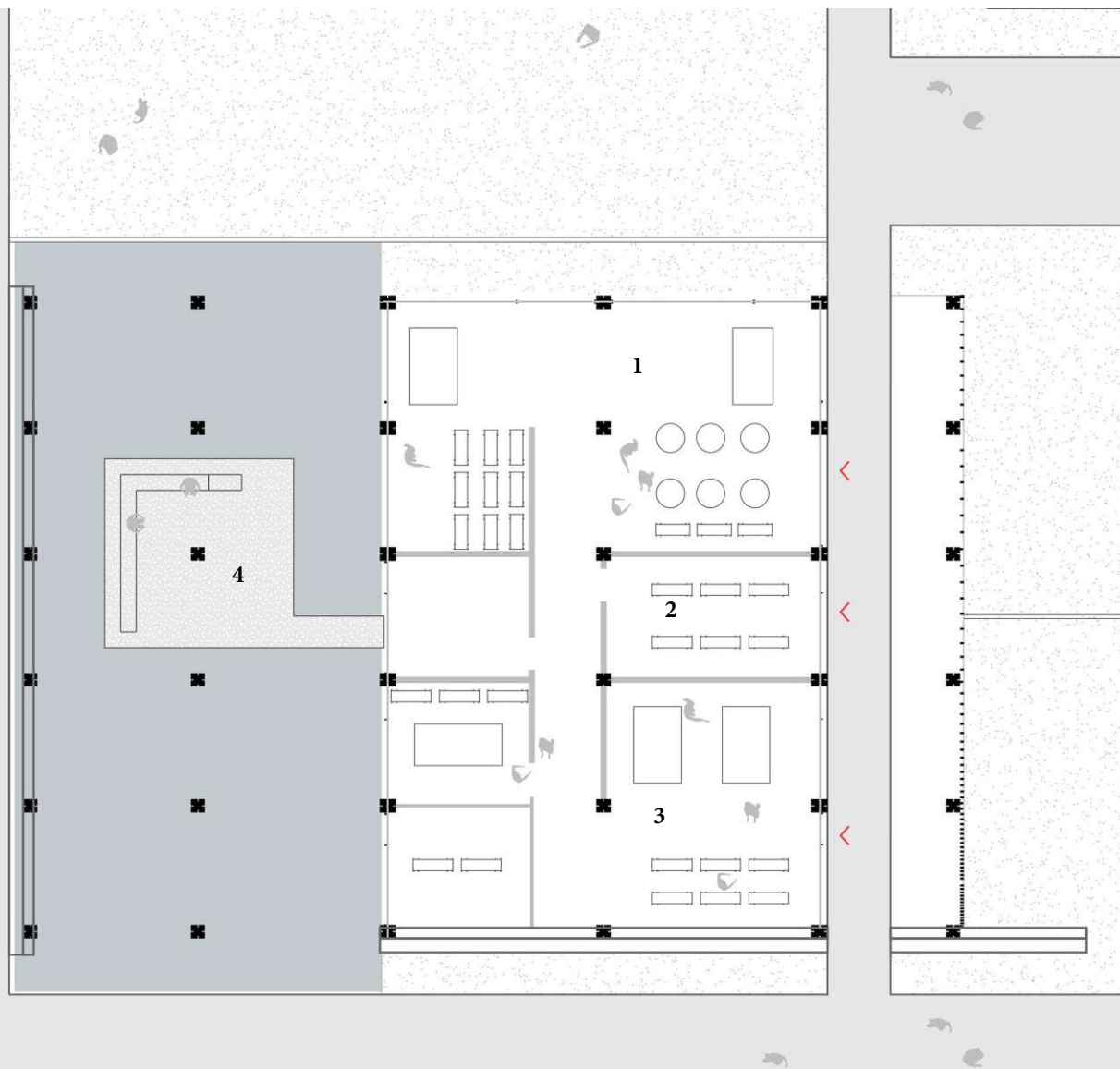
- 1 Kitchen
- 2 Dining room inside
- 3 Dining space outside
- 4 Storage
- 5 Toilette



Floor plan Rice flour lab

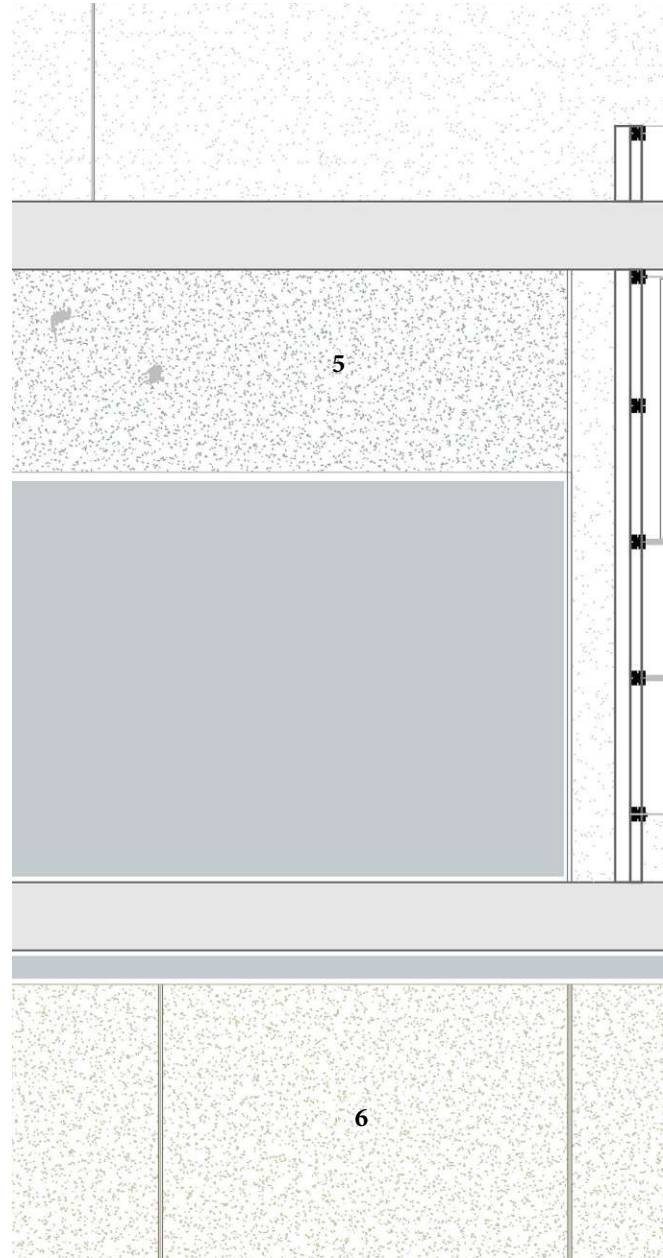
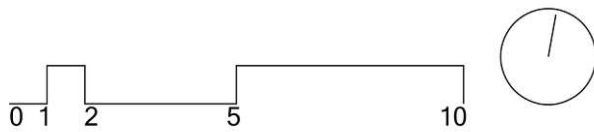
- 1 Milling room
- 2 Storage
- 3 Workshop space
- 4 Roofed leisure spot in water basin

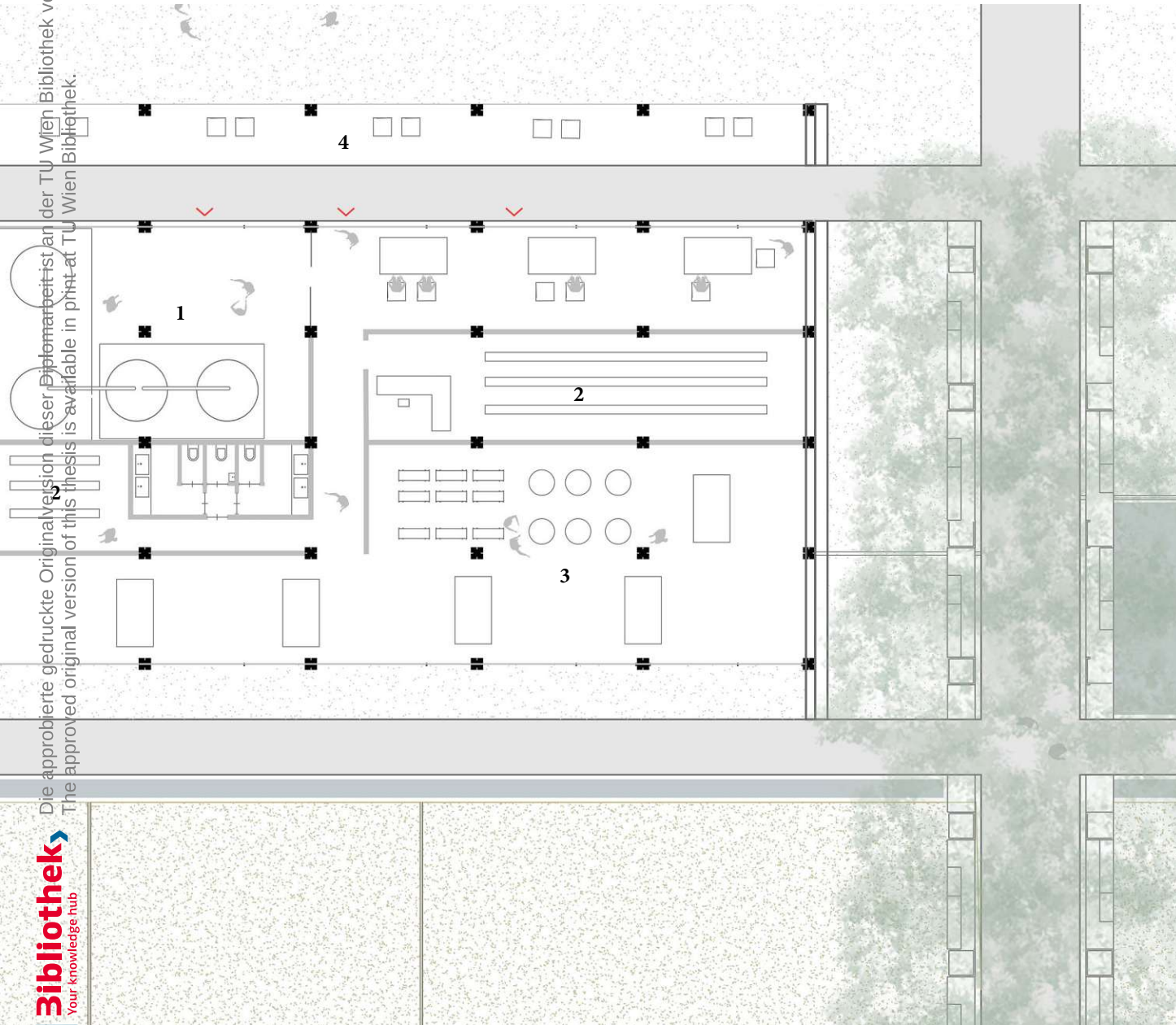




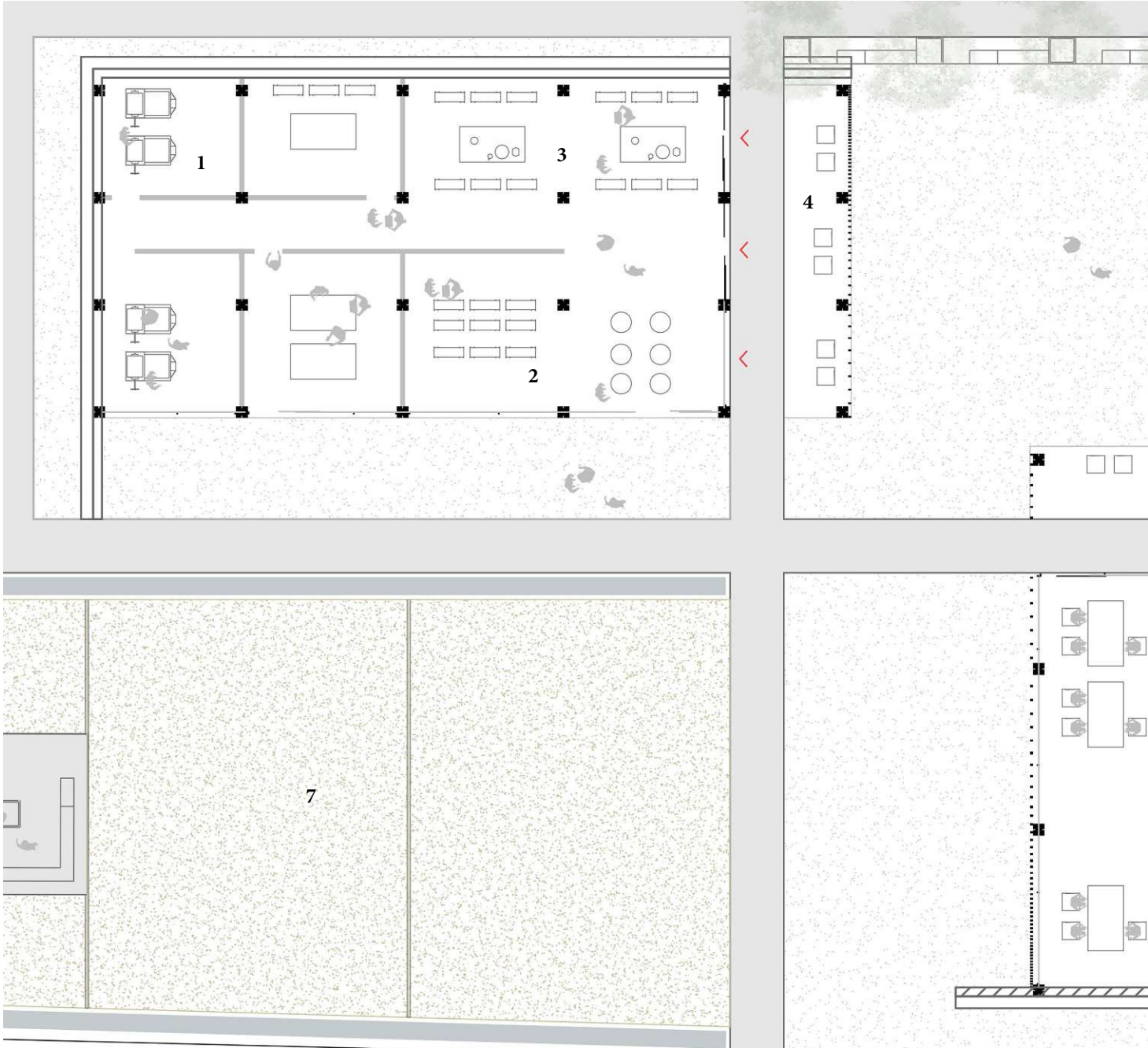
Floor plan Fermentation lab

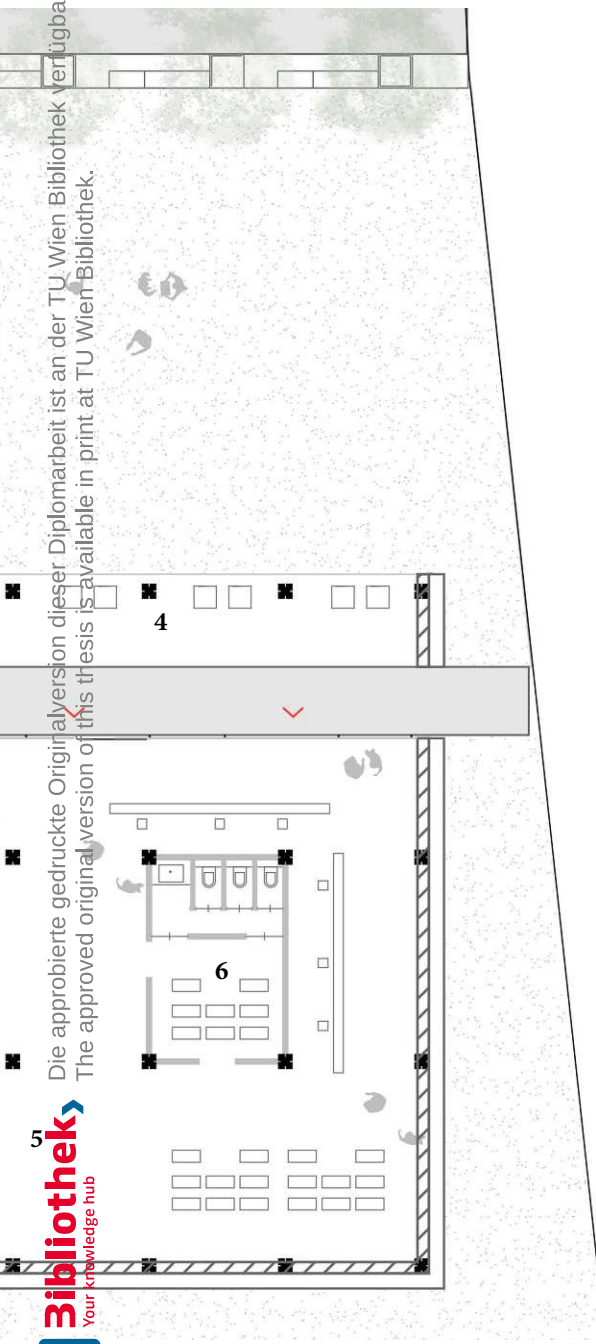
- 1 Fermentation room
- 2 Storage
- 3 Workshop space
- 4 Roofed sitting possibilities
- 5 Nursery field
- 6 Rice paddy





Floor plan Clay lab and Seed lab



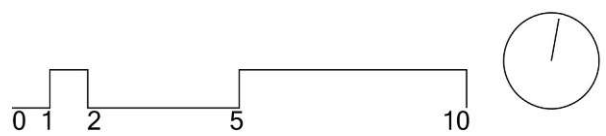


Clay lab

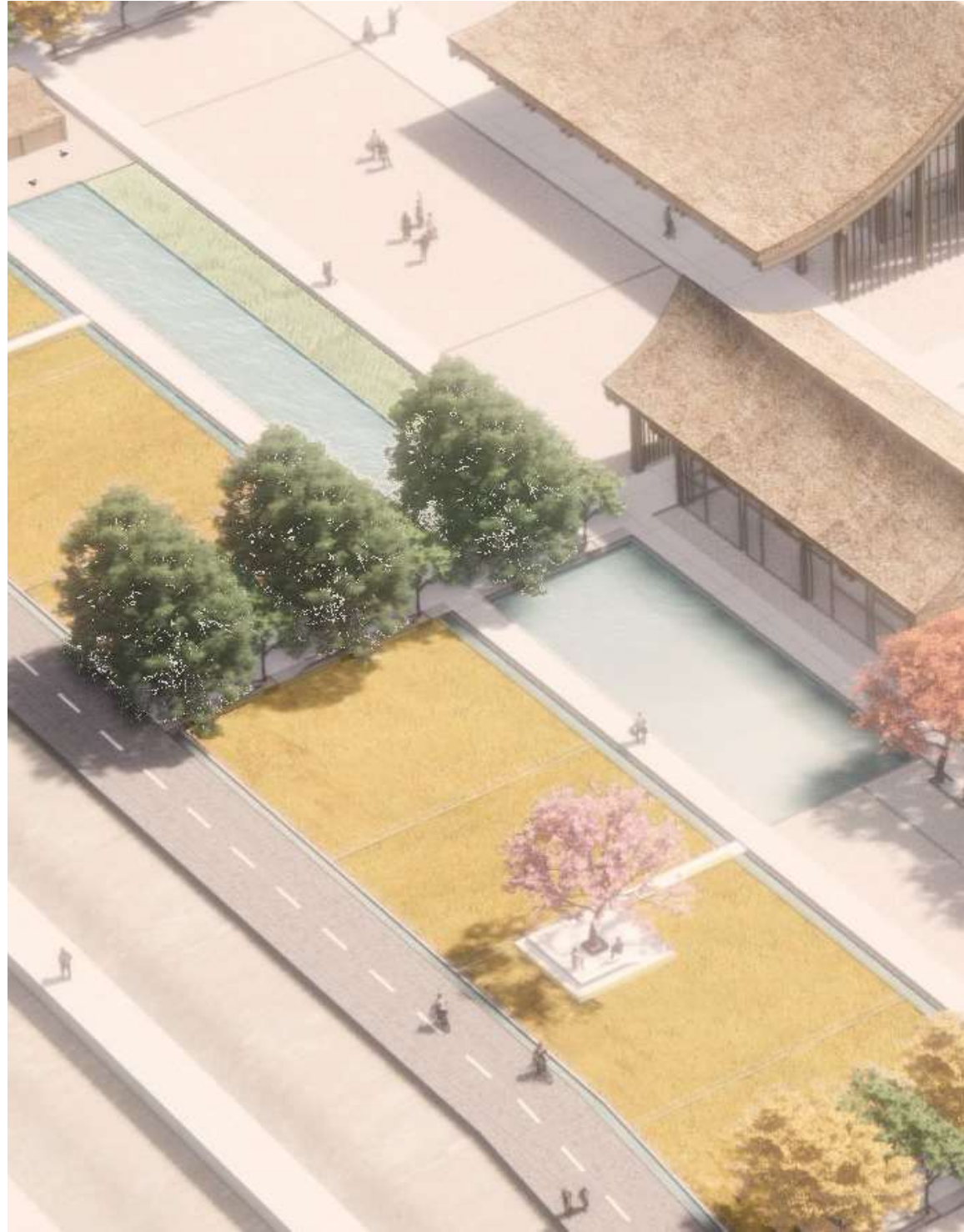
- 1 Machine room
- 2 Storage
- 3 Workshop space
- 4 Roofed sitting possibilities

Seed lab

- 4 Roofed sitting possibilities
- 5 Seed laboratory
- 6 Storage
- 7 Rice paddy

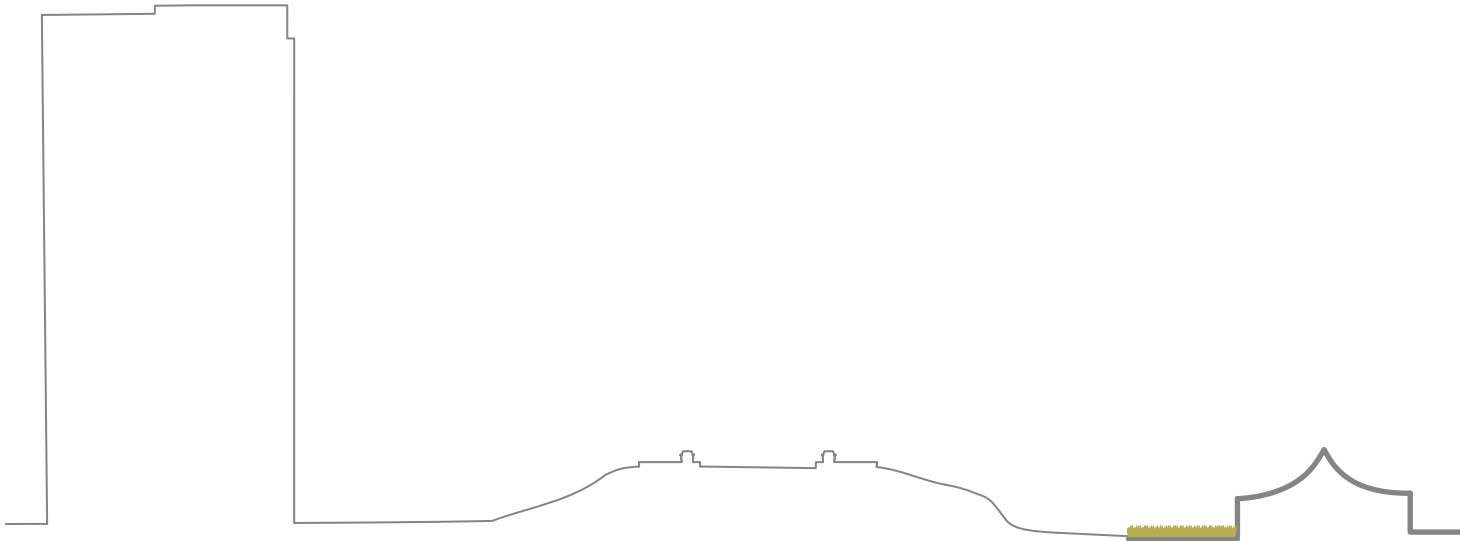


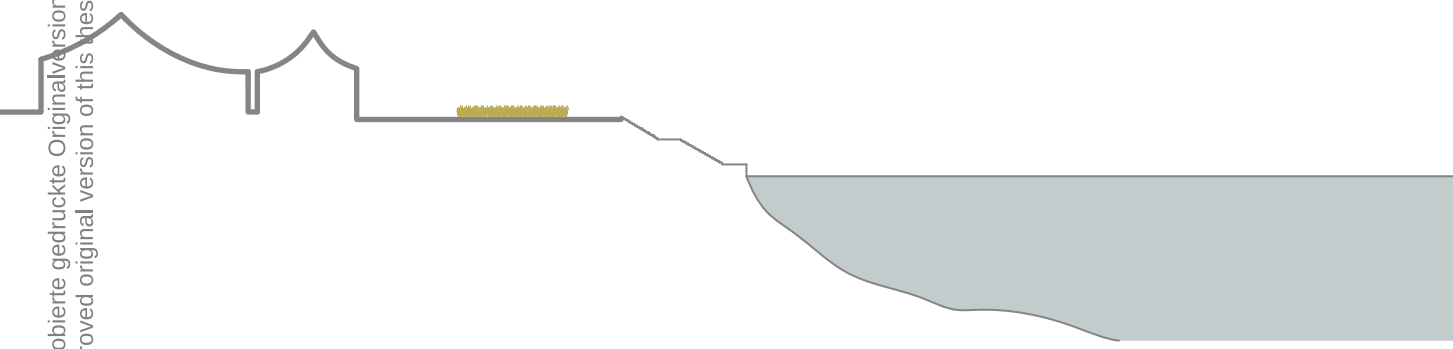
Bird view



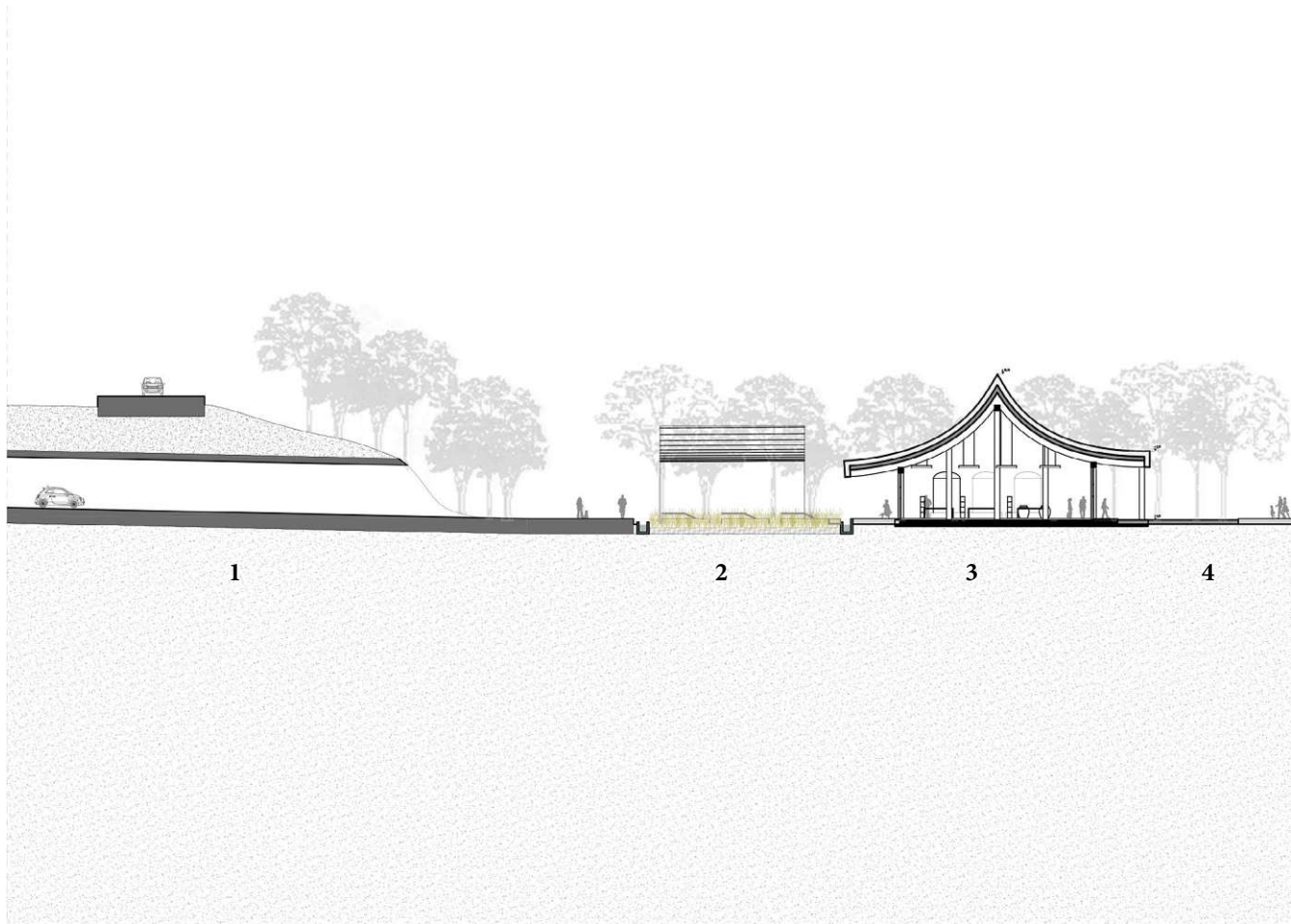


Silhouette



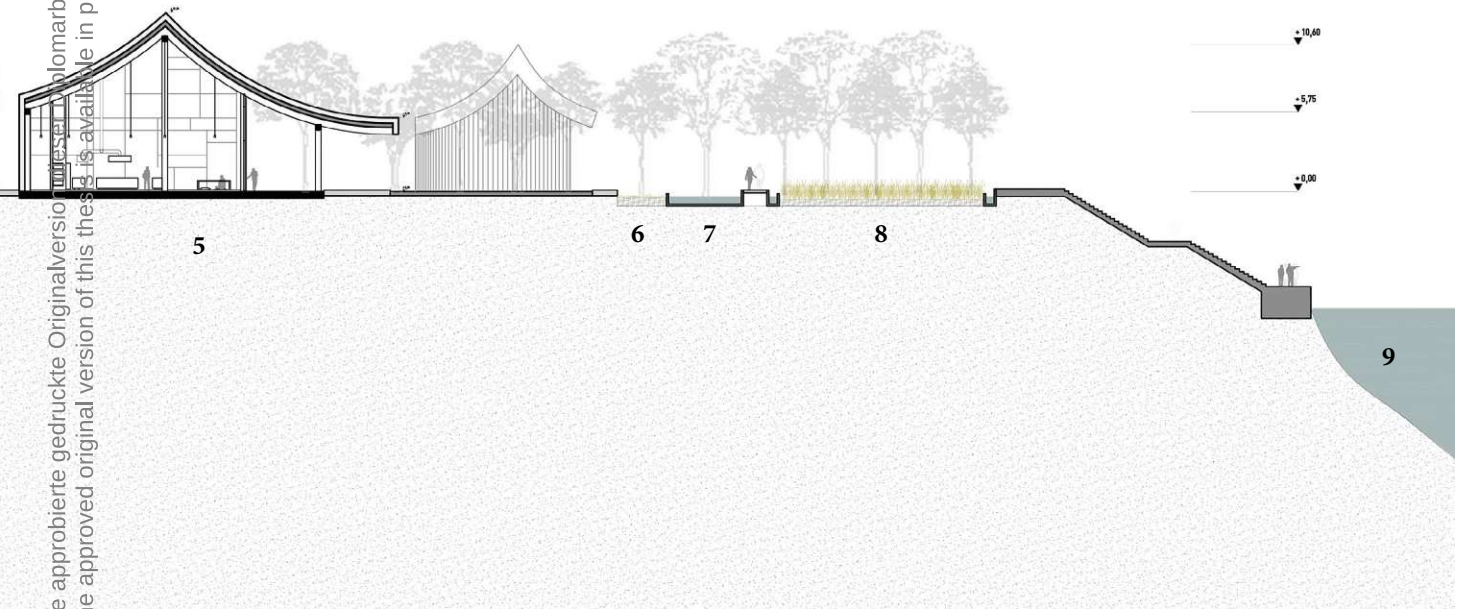
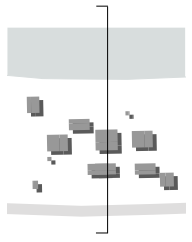


Section

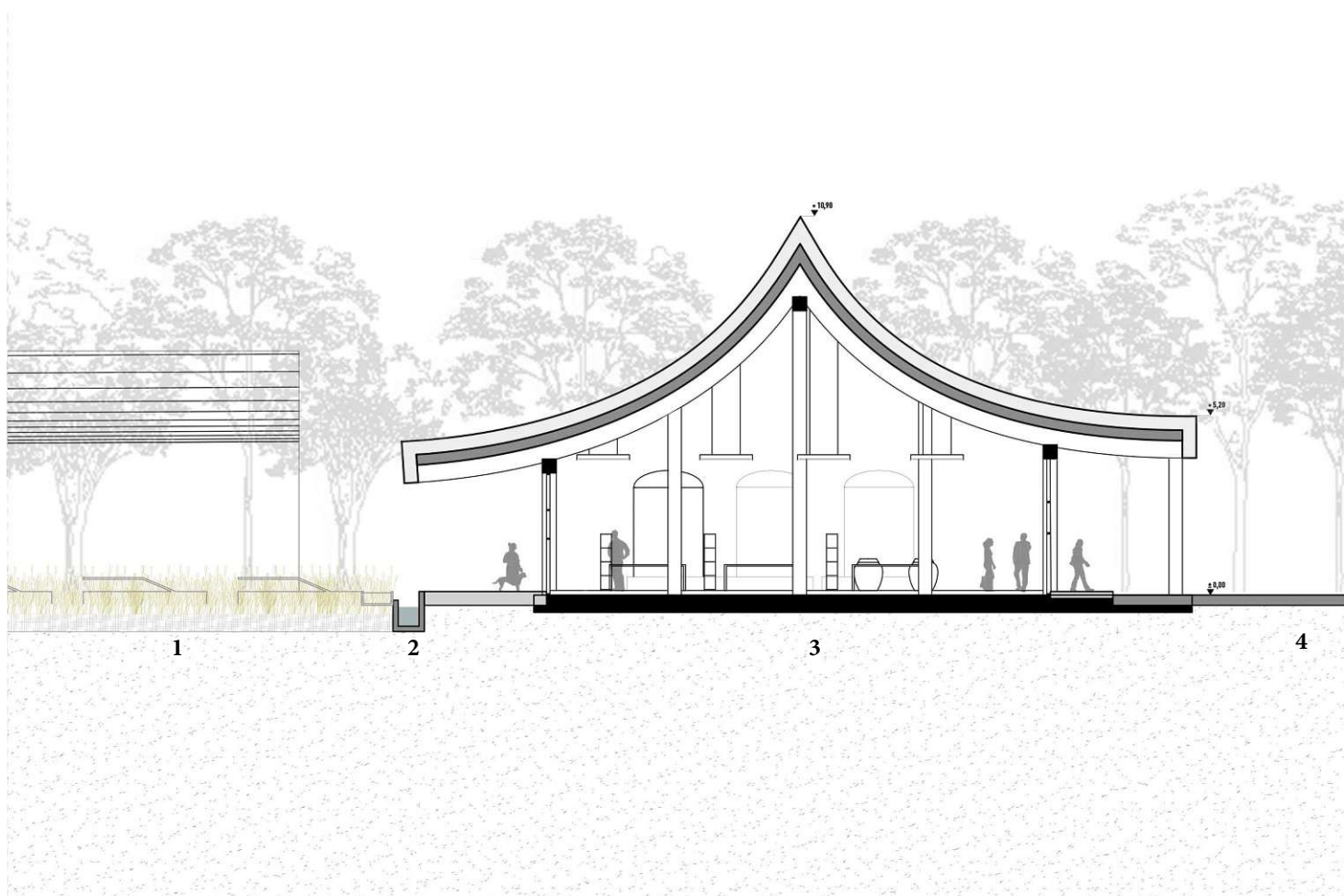


- 1 Car tunnel
- 2 Rice paddy
- 3 Fermentation Room
- 4 Plaza
- 5 Restaurant
- 6 Nursery field
- 7 Water basin
- 8 Rice paddy
- 9 Hangang River

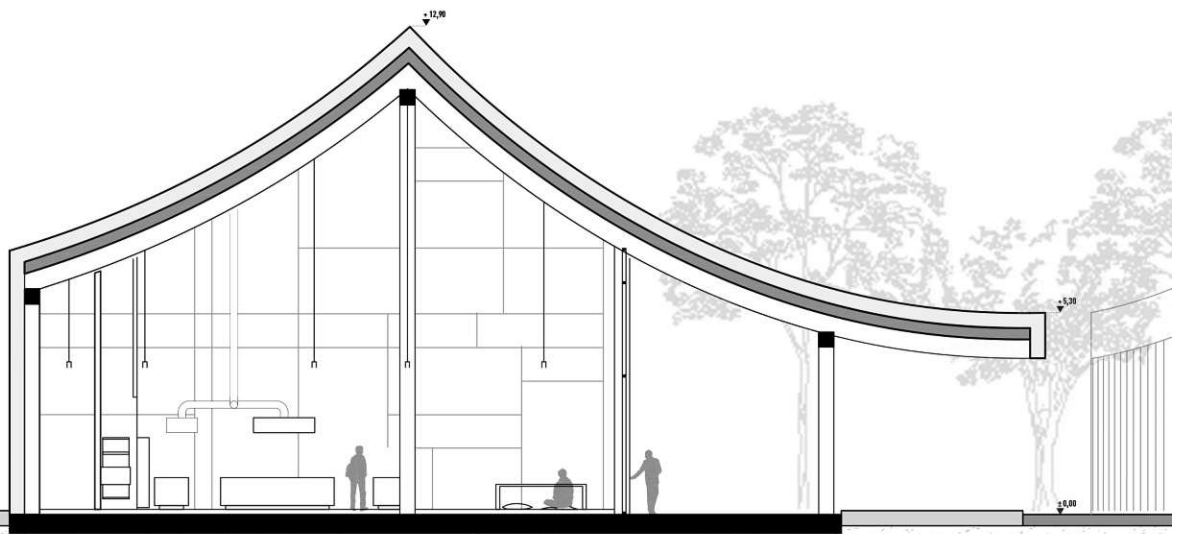
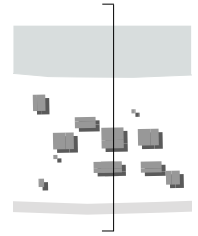
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Section



- 1 Rice paddy
- 2 Water channel
- 3 Fermentation Room
- 4 Plaza
- 5 Restaurant



5







Bird view



BASEMENTS
STEPPING STONE



STRUCTURE



FAÇADES WALL



ISOLATION



ISOLATION
ROOF COVERING

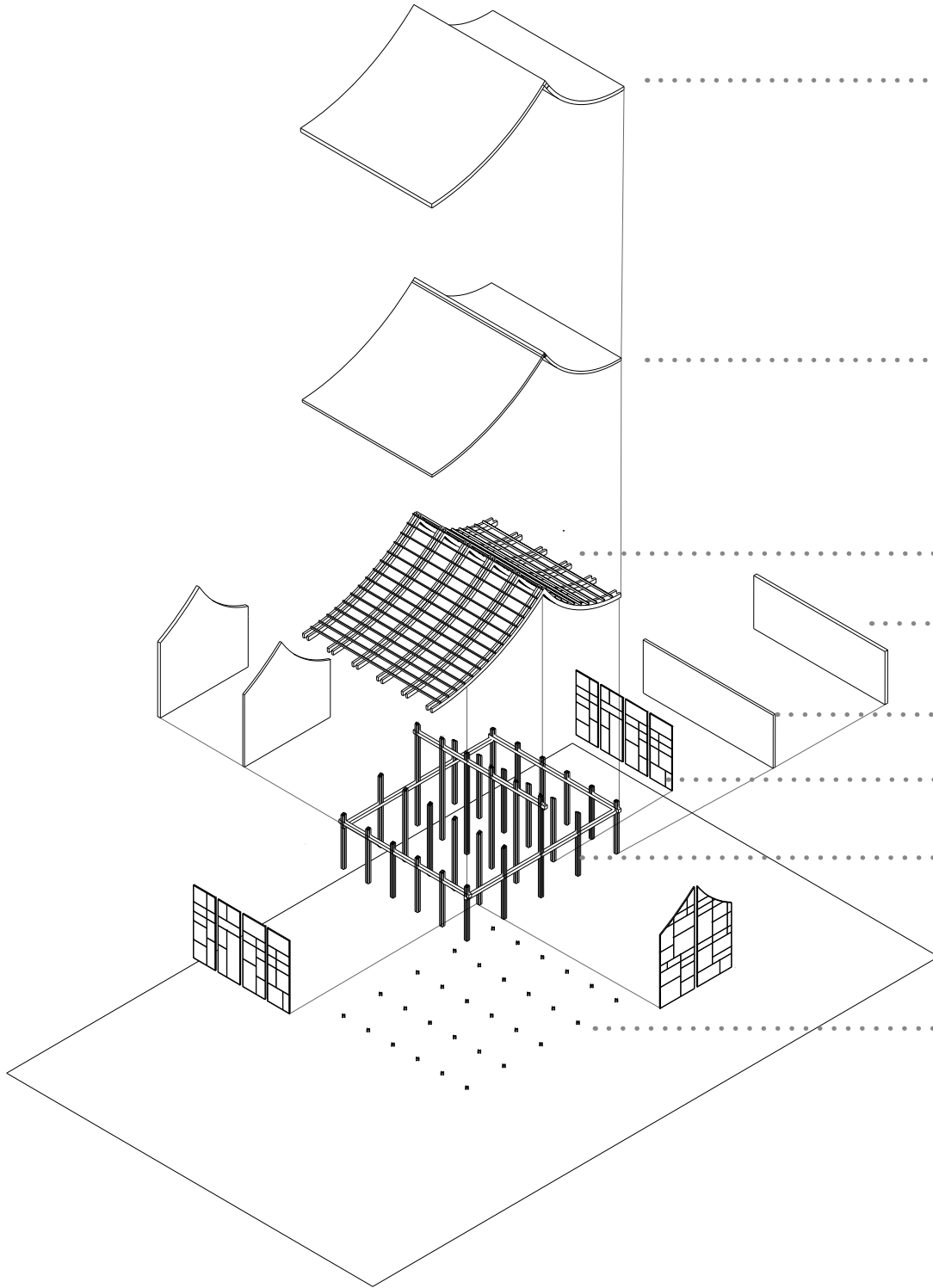
Material choice and structure

The materials chosen are already present in the vernacular Korean architecture. The structure is made from red pine wood, a very typical Korean construction wood. Columns and the curved roof beams are made from also wood. Stone is used for the basement and for the paths which remembers the steppingstone on the Hanok. The Façade construction is made of clay and isolated with husk panels from RiceHouse and straw isolation. Two façades are transparent due to open the view towards the rice paddy.





Roof structure



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..... Rice straw external layer

..... Roof construction (Insulation, timber cladding etc.)

..... Roof Structure in red pine wood, curved beams 50x25cm

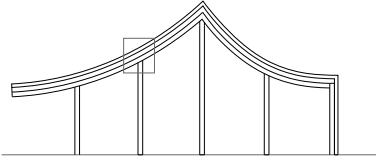
..... Rice straw external layer

..... Straw and Clay wall

..... Glass facade in steel frame

..... Wood columns 40x40cm

..... Steel base for columns

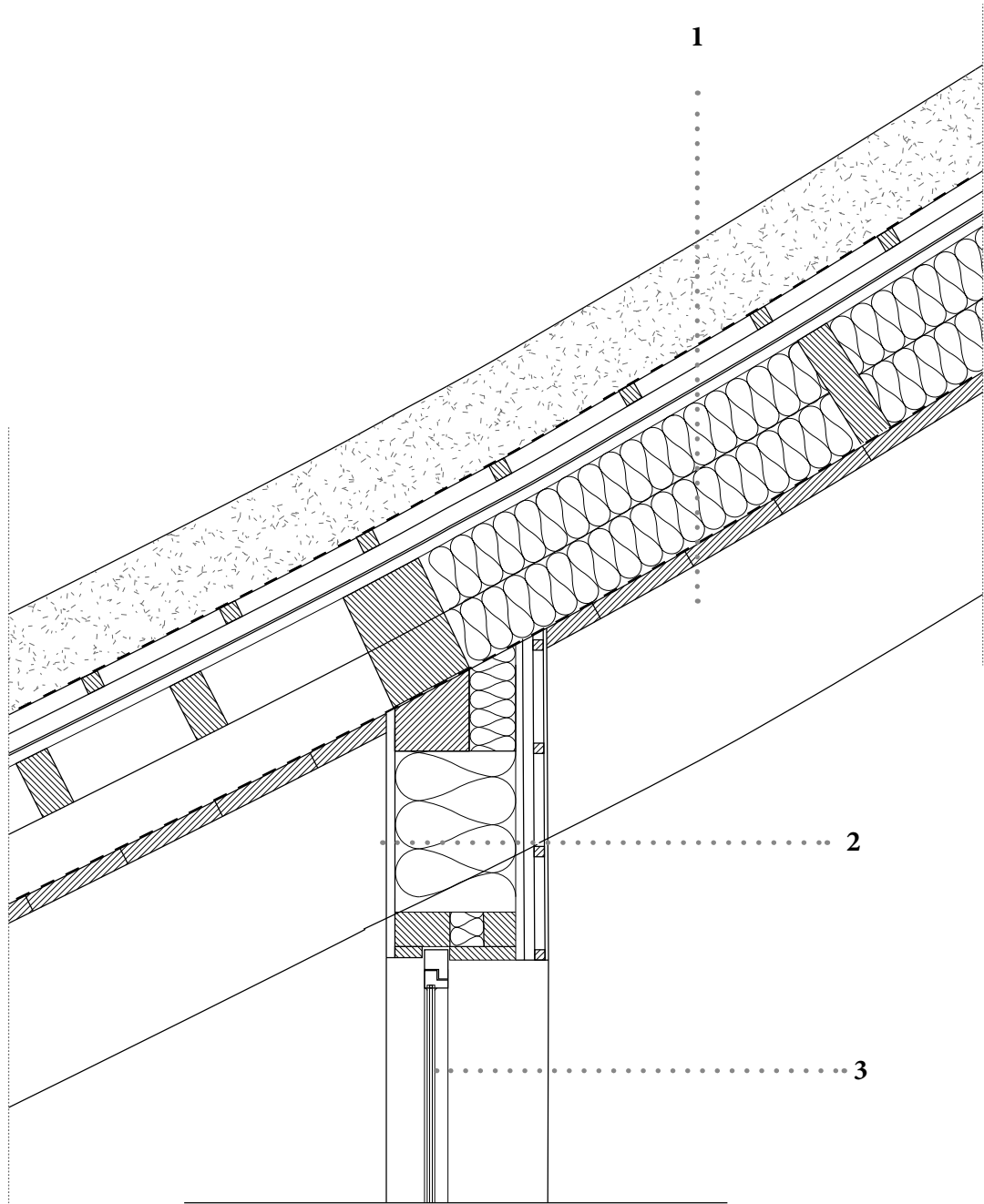


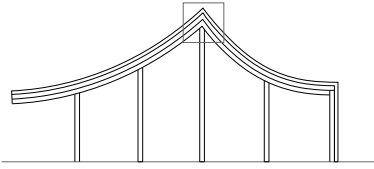
1		
Thatched straw	250mm	
Underlay felt		
Batten	50mm	
Counterbatten	50mm	
Bituminous sheeting		
Timber cladding	30mm	
Rice straw insulation	350 mm	
Bituminous sheeting		
Timber cladding	50mm	
Timber beam	250x500mm	

2		
RH 100 Base Plaster	20 mm	
Reinforcement Steel		
Rice straw insulator	350 mm	
RH 700 Thermal panel in clay	22 mm	
Installation cavity		
Batten	50mm	
Counterbatten	50mm	
RH 410 Finishing plaster in clay		

3		
Triple glazing		

Detail 1 M1:20





1

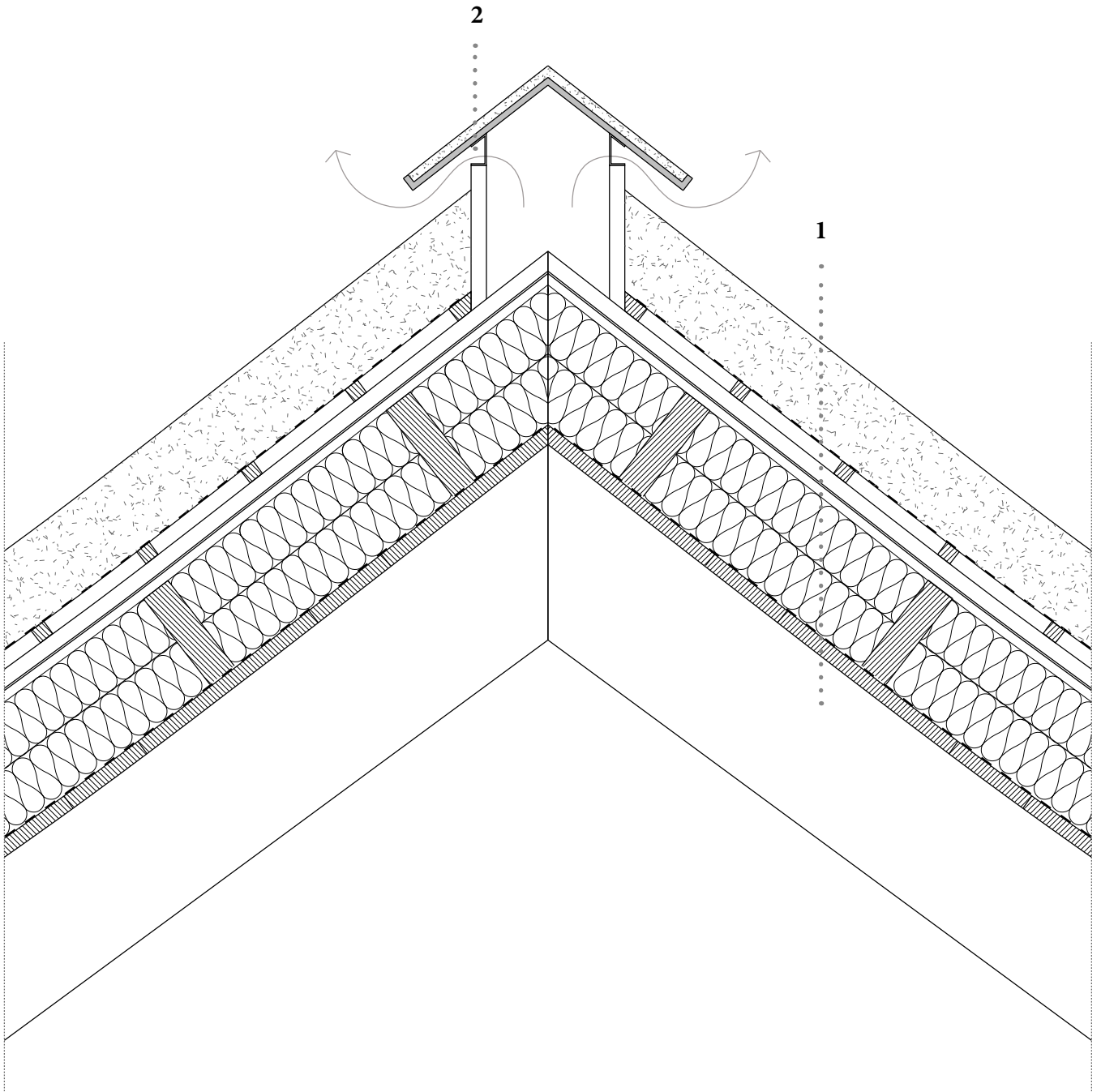
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Underlay felt	
Batten	50mm
Counterbatten	50mm
Bituminous sheeting	
Timber cladding	30mm
Rice straw insulation	350 mm
Bituminous sheeting	
Timber cladding	50mm
Timber beam	250x500mm

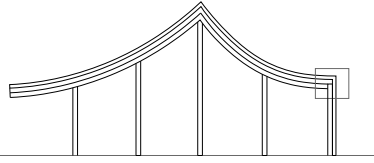
2

Opening for ventilation

Straw mat	22mm
Steel profile	10mm
Insects net	

Detail 2 M1:20





1

Thatched straw	250mm
Underlay felt	
Batten	50mm
Counterbatten	50mm
Bituminous sheeting	
Timber cladding	30mm
Rice straw insulation	350 mm
Bituminous sheeting	
Timber cladding	50mm
Timber beam	250x500mm

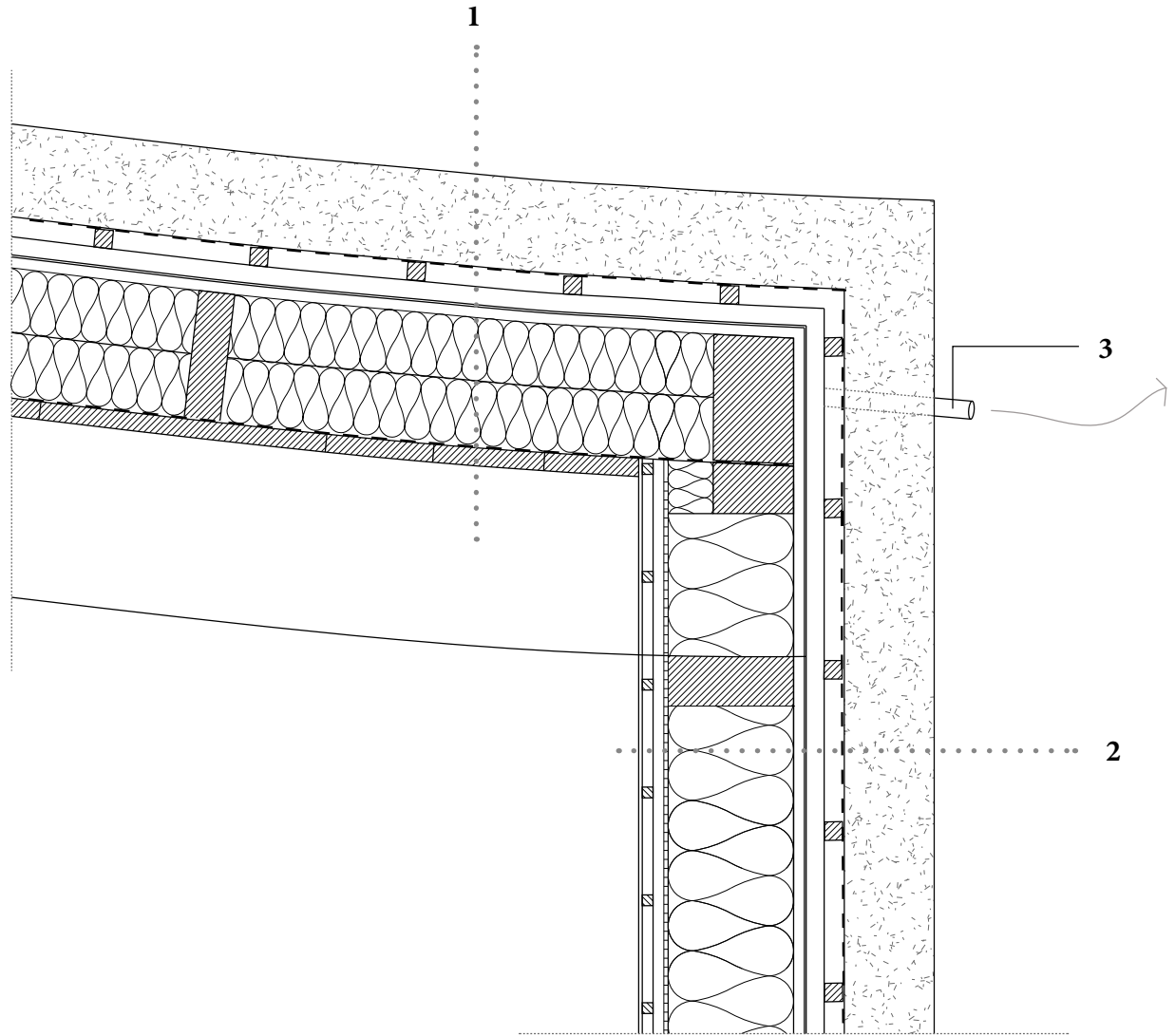
2

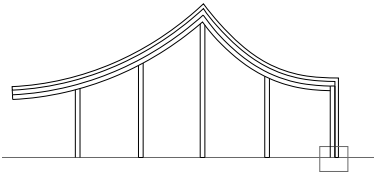
Thatched straw	250mm
Underlay felt	
Batten	50mm
Counterbatten	50mm
Bituminous sheeting	
DWD-Panel	19mm
Rice straw insulator	350m
RH 700 Thermal panel in clay	22cm
Installation cavity	
Batten	50mm
Counterbatten	50mm
RH 410 Finishing plaster in clay	

3

Ventilation Tube	Ø50mm
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Detail 3 M1:20



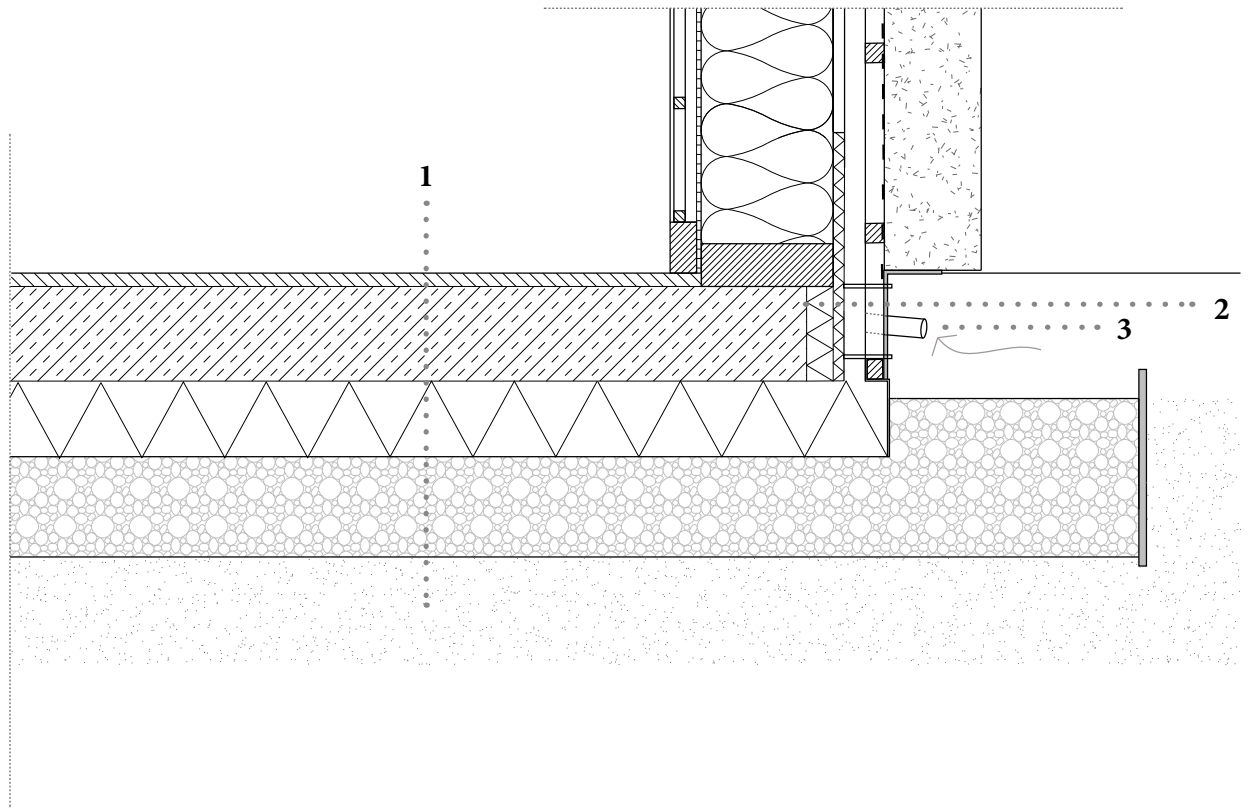


- 1**
Polished screed 35 mm
Reinforced concrete
floor plate 250 mm
XPS thermal insulation 200 mm
Gravel

- 2**
XPS Base insulation 140mm
L-Profile

- 3**
Ventilation Tube Ø50mm

Detail 4 M1:20







Rice flour workshop

My gratitude goes to

Ass. Prof. Mladen Jadric

my family

Anna

Piero

Ilaria

Jacopo

my friends

Leonie

Valentina

Dennis

my Korean supporters

Prof. Inhee Lee

Minkee

Byounghun

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