

REPLANT THE SEED

FILLING THE EXCISTING GAPS IN AGRICULTURE DEVELOPMENT BY INTEGRATING A RESPONSIBLE ACHITECTURAL SOLUTION

VOLUME

Max Peijnenburg
Graduation Project

MA+U
18.06.2020

Index:

	:
Essay	1 - 5
Research findings	6 - 8
Logbook	
1. First proposal	9 - 12
2. Project specifications	13 - 18
3. Project specifications complimentation	19 - 21
4. Research	22 - 29
5. Conceptual design	30 - 39
6. Preliminary design	40 - 54
7. Definitive design	55 - 67

Main experts:

Agricultural business:

P. Teurlings (farmer)

P. Teurlings is the owner of the dairy farm and is an important link in the evaluation of the current production process. He knows exactly what he needs to run his business and is therefore essential for this architectural transformation. By together analyzing his farm, it became clear where possibilities could arise. It is also important that P. Teurlings is a board member of the ZLTO Brabant. This is the largest agricultural organisation that represents the farmers in Brabant. This organization strives for innovation, which increases the chance that this design will be realized.

Loonse & Drunense dunes:

Chris-Jan Peijnenburg (resident Udenhout)

To obtain information about the area around the Loonse & Drunense dunes, contact was made with Chris-Jan Peijnenburg. He is familiar with the history, problems and the agricultural sector in the area. As a result, contact has been made with P. Teurlings.

Chris-Jan Peijnenburg informed me about the increasing pressure from pretpark the Efteling to use the area of the Loonse & Drunense dunes to realize the park expansion. The amusement park plans to increase the recreation facilities around the area so that the park can offer multi-day packages to the visitor. This is in line with the expansion of the shell, where it is important to absorb this recreational pressure.

Stable construction:

Mario Welvaarts / Ralf Theelen - Slaats Asten BV

To gain insight into the relevant context, it was decided to contact Slaats Asten BV. This collaboration has resulted that the project being provided with more technical aspects. Together with Mario Welvaarts and Ralf Theelen, we looked at the preservation of the construction, the reuse of the concrete basement despite the years of ammonia content in the concrete and the other materials that are available on the yard to be re-used.

Circular system:

Mieke Peijnenburg van Rooy - ABZ Dierenvoeding

Together with Mieke Peijnenburg van Rooy, it was determined how the circular cycles could be closed. Within this system, the animals are central because they work as a catalyst to provide the biogas installation with residual products. We looked at the essential nutrients in concentrated food for chickens, pigs and cows. By combining this with research from external research, it was possible to realize a revenue model that contains all the elements to keep the process running.

mentor academie

Jan Willem van Kuilenberg / Pieter Feenstra

mentor extern:

Dingeman Deijs - Dingeman Deijs Architects

REPLANT THE SEED

FILLING THE EXCISTING GAPS IN AGRICULTURE DEVELOPMENT BY INTEGRATING A RESPONSIBLE ACHITECTURAL SOLUTION

ESSAY

Changing the agricultural culture

Architecture will form a social and ecological system for the increasing vacancy within the agricultural sector around the Loonse & Drunense Dunes, whereby it frames the collective balance between increasing recreational pressure and large-scale sustainability of the area.

By expanding the field of architectural design into programmatic studies, the project aims to claim an renewed circular agricultural system as part of the architectural and industrial object.

This results in a new experience of the agricultural company where the renewed circular agricultural system defines space and function which forms the architectural transformation that combine industrial business with opportunities for visitors to become part of this new form of agriculture.

Loonse & Drunense dunes

The transformation is a response to the new policy of the municipalities around the Loonse and Drunense dunes, which have stated that the recreational pressure of the area must be absorbed by the surrounding shell. It is also important that intensive livestock farming in this area makes way for sustainable, ecological solutions that contribute to improving the quality of the landscape. This is done to prevent small agricultural businesses from leaving the area and be replaced by mass industry.

A medium-sized dairy farm will be transformed with a renewed circular system that makes it possible to create a self-sufficient business model within the current contours of the existing situation. By studying the current agricultural system, it is obvious to conclude that many raw materials must be bought to keep the business running. On the other hand, the rest products from the production process are not used, which leads to large costs for the farm. This indicates the need to adapt the current system.

The farm that has been selected for this, is located in the shell of the Loonse and Drunense dunes and is directly attached to the sub-area 'The Brand'. The current farm has about 75 hectares of land and has a typical farm typology, in which the farmhouse is located parallel to the street with the barns at the back of the yard. These various buildings each date from a different year of construction, which makes them clearly distinguishable in materialization and building methods.

This architectural transformation shows the renewed, presenting business model in which a interconnection occurs between space and function. These spaces provide a new experience of the agricultural activities and form a direct link with the surrounding landscape. The design shows the balance whereby the integrated transparency within the farm reveals a circular system that responds to the ecological and educational principles for the agricultural sector of the future.

Circulair cycles

The agricultural sector is characterized by large-scale closed buildings, which do not show any of the production processes. In order to create transparency, not only the farm, but also the current agricultural system will have to face transformation.

To make the current agricultural system circular, substitute elements need to be added. These serve as a replacement for the production of animal feed. New products like insects, duck grown and algae are added within the production process. The same applies to plants such as sorghum, hennep and lupine which are planted in the fields to ensure that the necessary raw materials are available on site. Innovative production processes like aquaponics and vertical agriculture are also being added, which leads to the increase of diversity in end products. This extension of the production process will respond to the constant change of demand for vegetable products.

Because the diversity of products is increased, it is possible to combine them in smaller numbers. The current number of cows on the farm will be reduced and replaced by the addition of chickens and pigs. The manure from these animals can be used for the biogas installation, which ensures that rest products become an essential element to close the cycles. The biogas installation provides electricity, heat, hot water and biogas that will be transported to the designated areas. This biogas installation has the capacity to provide 40 households with these resources. This is more than the farm needs so the surplus will be returned to the supply network. This is calculated on the basis of the amount of parcels needed to grow crops, the fields required for the cows to graze, the manure produced and the capacity of the biogas installation.

Architectural transformation

The transformation of the current farm consists of a cohesion of different elements that are related to each other. First of all, the current state of the various buildings in the yard was examined. Each of them date from a different year of construction, so the overall cohesion of the buildings on the farmyard has disappeared. Each building has its own architectural style and materials that come together within the typical farm typology. This typology is purely arranged to the production process, making the yard look like a static entity with contiguous closed buildings. That is why it was decided to demolish the large-scale closed building in the heart of the plot and to re-use the material to create a transparent public area that is enclosed by the other stables on the yard.

The current construction of the stables are retained within this transformation. This construction is completely covered with a **rhythm** of wooden slats that ensures a **semi-transparent** facade. In this way, distinction is no longer made in a wall-to-roof structure, as a result of which the new building appears to **emerge** from the landscape like a hill. The facade is not interrupted by various elements, so that the facade retains a monotonous appearance. The facade ensures that the production process starts to move in a contemporary way. This happens because the rhythm of the wooden slats provides a visual **movement** when you pass the buildings.

The inner volumes within this new outer skin are pushed back to emphasize the shape of the building. These **sightlines** define the spaces and also ensure that facade openings are created that remove the boundary between the **routing** and the agricultural landscape. This creates an interesting indoor/outdoor space that will be experienced as semi-open or semi-closed.

In order to affect this slatted structure as little as possible, it was decided to run the pipework underground. The machines are part of the circular system and therefore visible in production areas. These machines will have an above-ground supply that is visible to the visitor. The underground disposal of end products such as electricity and biogas goes underground to the designated locations.

Extension of the program

The two large stables will accommodate the circular system, taking the storyline into account. The intention is that the visitor becomes part of this system. This is only possible if you follow the route through the process. The volume of the building has a renewed inner shell of glass so the entire process will be visible. By entering the building, the visitor will experience the production process not only by sight, but also by feeling, smelling, tasting and hearing.

The route is important to experience the entire process. By linking the circular cycles to the route, the visitor will be included in the process that starts with the production of algae and ends in the inner green garden. The inner green garden is located at the heart of the yard and has a direct connection with the existing farmhouse. This farmhouse is provided with a shop, to buy local products. This shop is located in the area where the cows were situated, before the barns were built. As a result, this adjustment of the program will not affect the facade image from the street side. It must remain intact so it will not disturb the typical, rural character of the street scene.

The green inner garden offers places for visitors to relax and consume the purchased local product. This is equipped with a transparent multifunctional pavilion that merges into the renewed area. Lectures, workshops and meetings can be given here. The other new building volume that is attached to this green inner garden is the cow pavilion. This cow pavilion provides space for approximately 30 dairy cows that are milked on-site by means of a mobile milking machine. These dairy cows walk on a renewed floor system that can separate the hard and wet manure before it goes to the biogas installation. In this way, ammonia is not produced.

These new building volumes in the heart of the yard are lower and different in shape, compared to the large stables which creates a more enclosed feeling from the inner green garden. In this way, the volume of the characteristic stables is preserved, giving you the feeling that you are entering a framed courtyard. To enhance this feeling, it was decided to raise the pavilion and merge it with the reintegrated alder trees which has been replaced by oak trees in the area 'The Brand' around 1950 due to the increasing demand for building materials. Alder wood is not a material that can be built with, so to retrieve history, it was decided to reintegrate this tree into the inner green garden. This also applies to a number of native flowers and plants that are characteristic of the area. This merging of trees and building volumes also applies to the cow pavilion, where it also seeks the link with the other large-scale buildings in the form of the wooden slats. The cow pavilion is expressing the route and serves as a visual link between the two large buildings.

Some elements are essential to form the basis for an innovative program within the farm. It is important that the visitor can literally become part of the circular system. This is done by opening up the production areas, but also giving visitors the opportunity to consume the final products of the farm within the green inner garden. It is also possible as a visitor to integrate within the farm through the accommodations. These accommodations have a kitchen with living room on the ground floor and a bathroom with bedroom on the top floor. The accommodations are insulated compared to the production areas and have a direct connection with the green inner garden. This concept contrasts with the current policy within the agricultural sector in which employees or seasonal workers are often hidden within the farmyard.

This new way of farming means that the farmers' daytime activities will change. The transformation merges the boundary between living and working. Nevertheless, within the current concept, the leisure activities of the farmers' family took place in or around the front garden. This does not have to change within the new concept.

Architectural image

Materials and detailing play an important role in the architectural image. The materials that are mainly visible in the design, can be found on the existing farm. Examples of these are the re-use of the old pavement and construction beams. The walls are finished with a white outer plaster, so that the inner walls form a **monotonous contrast** with the outer, red cedar wooden shell.

In addition, the existing steel columns and beams are painted black to increase the identity of the construction. This creates an interplay of dark and light colours that together form a contrast with the deviating, natural appearance of the wood.

The wooden slatted structure is applied as a single skin at the facades. Two layers of slats have been placed at the roof to reduce the direct sunlight entering the spaces. These inner slats are essential in the aesthetic perspective, but also in the production process in which direct sunlight can be harmful to the growth of plants, algae and duck grown. This system creates a coherent alternation between **light** and **shadow**.

The double layer of slats also ensures that the appearance of the facade flows through the inside of the building when you follow the route. This allows you to experience a **semi-outdoor** feeling despite the fact that the glass between the slats ensures that you stay dry. Within this system, the inner slats are attached to the inside of the plastic window frame, which makes it possible to open it to the inside for cleaning the inner slats, the glass and the outer slats without entering the roof.

Due to the fact that the windows are opened inwards, moisture might find its way in. This was solved by installing removable click gutters with sealing strips in provided notches between the two frames. This system ensures that the moisture is collected and transported to the general gutter. This creates a leaky detail, in which the moisture is removed in a controlled manner. These production areas are already provided with a humid atmosphere to promote plant growth. In this way, the architecture seems to come to life by embracing, reducing and enhancing the **natural elements** to improve the production process.

Future perspective

This project speaks for itself through a renewed way of agriculture that comes together in a contemporary architecture. It responds to the environment and ensures that a sustainable revenue model is created for the farmer. It hereby gives a response to the increasing, polluted mass industry within the agricultural sector, which literally seems to distance itself from its surrounding.

Because this new concept is based on an architectural transformation, it is possible to apply this within any existing agricultural company. In this way, the entire agricultural sector will literally become interwoven with the landscape and responds to the demand for sustainable climate solutions by making innovative ways of farming visible.

REPLANT THE SEED

FILLING THE EXISTING GAPS IN AGRICULTURE DEVELOPMENT BY INTEGRATING A RESPONSIBLE ARCHITECTURAL SOLUTION

RESEARCH FINDINGS

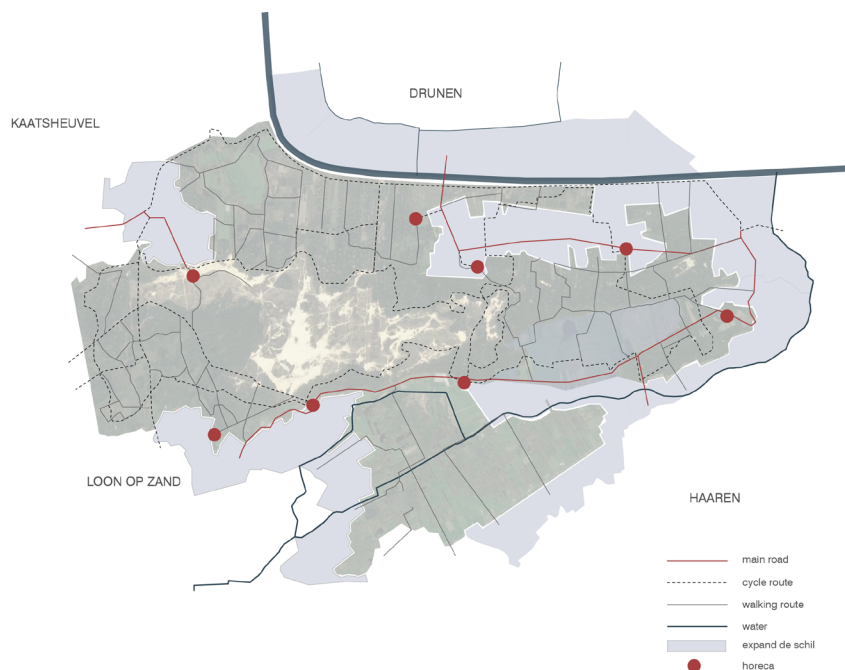
Scale enlargement

In response to the continuing negative reports about the agricultural sector, research has started to find out what causes this. This clearly showed that farming has changed over the years. The entire process has been completely transformed by means of economies of scale. As a result, more and more companies in Brabant will disappear. The companies that do have the financial means to survive are growing explicitly, which will change the landscape in this way.



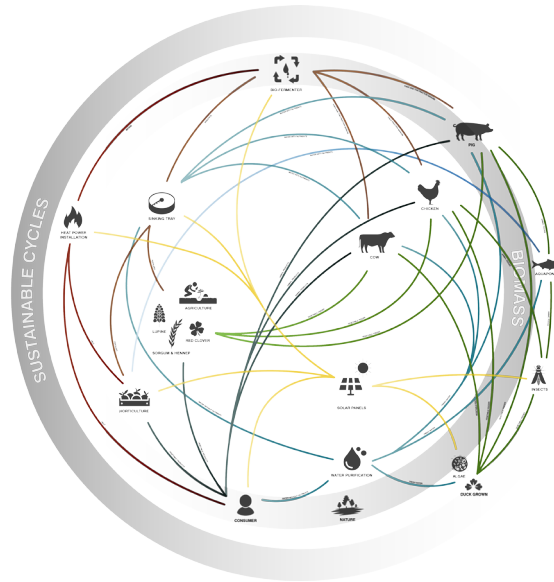
Loonse & Drunense dunes

Compared to the rest of the Netherlands, Brabant is the largest cause of environmental pollution in the field of agriculture. This problem is greatest within a circle around the municipalities of Loon op Zand, Haaren and Tilburg. These municipalities have the largest increase in vacant farms within the forecast for 2030. This area is surrounded by the Loonse and Drunense dunes. It is remarkable that this nature reserve is the most polluted nature reserve in the Netherlands. This is due to years of attempts at agriculture, in which a lot of manure was used to make the soil fertile.



Sustainable system

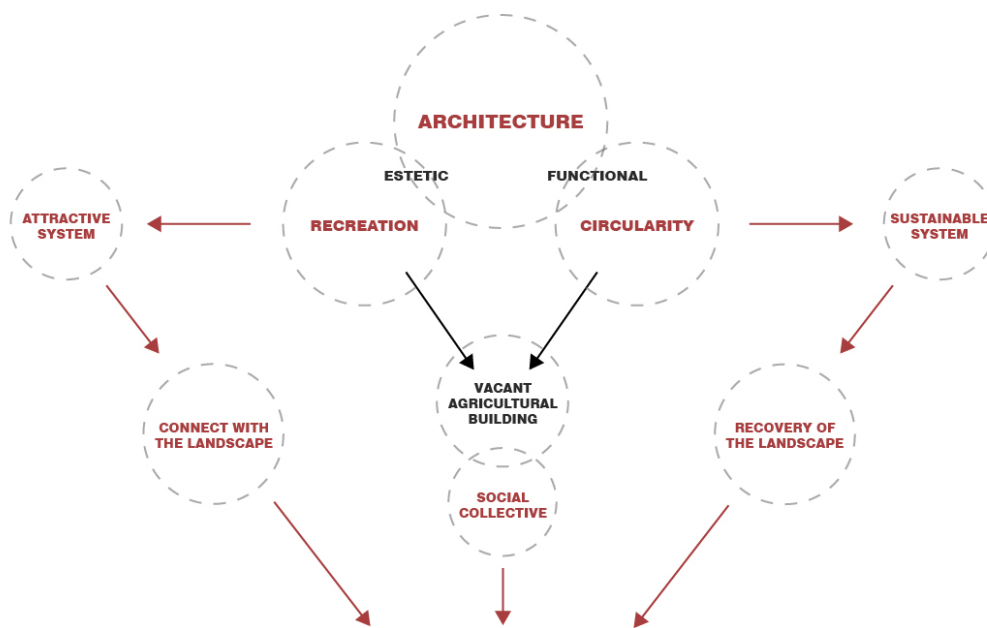
The region around the Loonse and Drunense dunes has drawn up a policy in which the recreational pressure is spread over the shell of the area. It is now mainly used for intensive livestock farming. According to the new policy, there will be no space for this in the future, as a result in which farmers will have to innovate in their farm or leave the area. It is also the intention to apply recreation within this renewed adjustment. By researching innovative possibilities, a system has been developed that can close the agricultural cycles of the farm. In this way, the farmer can continue his agricultural business in a sustainable manner.



CIRCULAR SYSTEM

Architectural transformation

On the basis of this renewed circularity, it was decided to apply this system to one of the existing farms that is part of the shell. Architecture is the connecting element for this transformation. Initially the intention was to use an empty farm, but since all farms in the area will start to feel the problems in the future, it was decided to choose a random farm in the region. This farm will initially serve as a test case for a starting point to create a sustainable network for the future.



RENEWED AGRICULTURAL AND ECOLOGICAL SYSTEM

ARCHITECTURAL TRANSFORMATION

REPLANT THE SEED

FILLING THE EXCISTING GAPS IN AGRICULTURE DEVELOPMENT BY INTEGRATING A RESPONSIBLE ACHITECTURAL SOLUTION

LOGBOOK

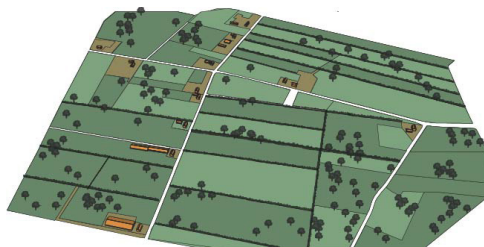
1. FIRST PROPOSAL

A RENEWED TYPOLOGY OF SMALL-SCALE AGRICULTURE ENSURES A SUSTAINABLE BALANCE WITHIN THE GROWING INDUSTRY AND THE CHANGE OF THE LANDSCAPE

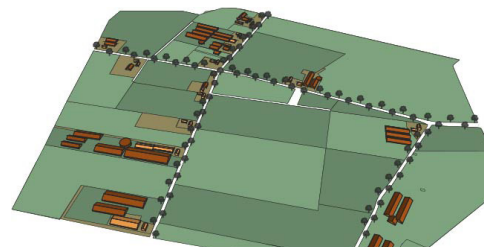
Architecture contributes to the renewed development of the natural and agricultural area in Brabant



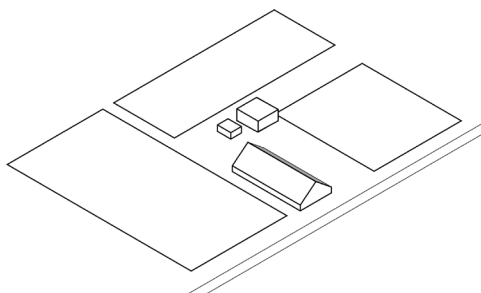
current situation in Brabant



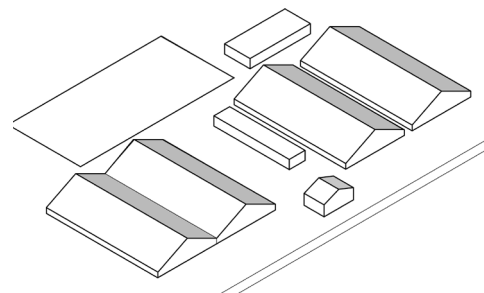
Oirschot, North Brabant in 1950



Oirschot, North Brabant in 2019



Farm typology in 1950



Farm typology in 2019

FORCED TO MAKE A CHOICE

- agriculture on the biggest polluters of this planet
- new environmental requirements in 2022
- no money to invest



Allow the company to phase out slowly and lease the land to retain income



Apply small-scale agriculture in combination with an extra function or activity

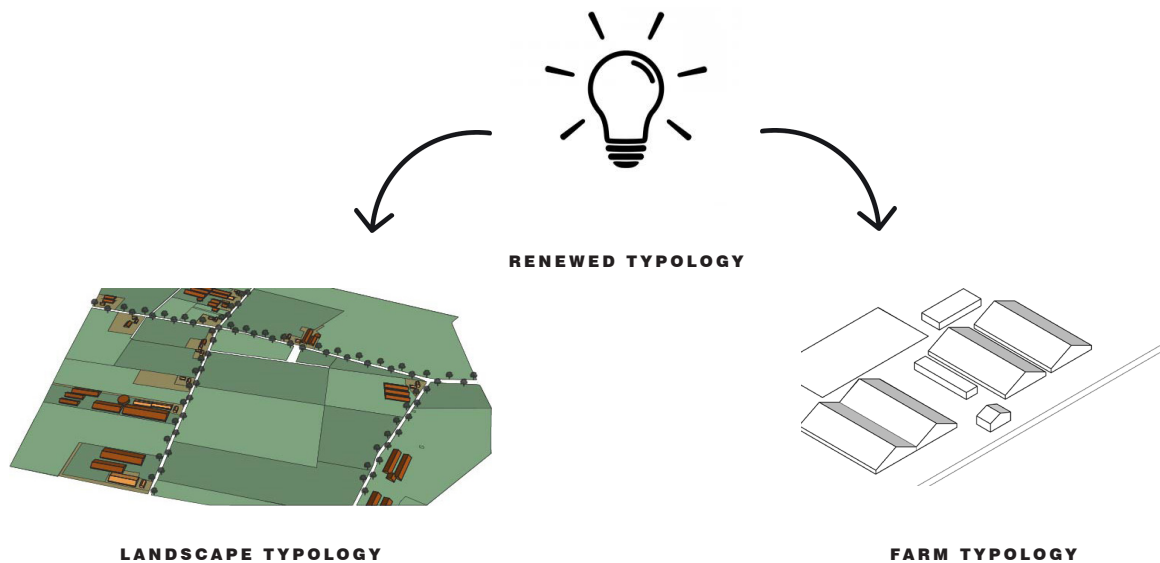
THE NEW FORM OF AGRICULTURE

- the farmer can continue his business
- small-scale agriculture as compensation for the non-replaceable larger farms
- the side activity ensures more visitors to the area
- the greenery can return to the area, with the farmer taking care of maintenance and checking
- the vacancy in the agricultural area will decrease
- small-scale agriculture can give an insight into the life of farmers
- the diversity in the area will be increased
- regional products will regain value



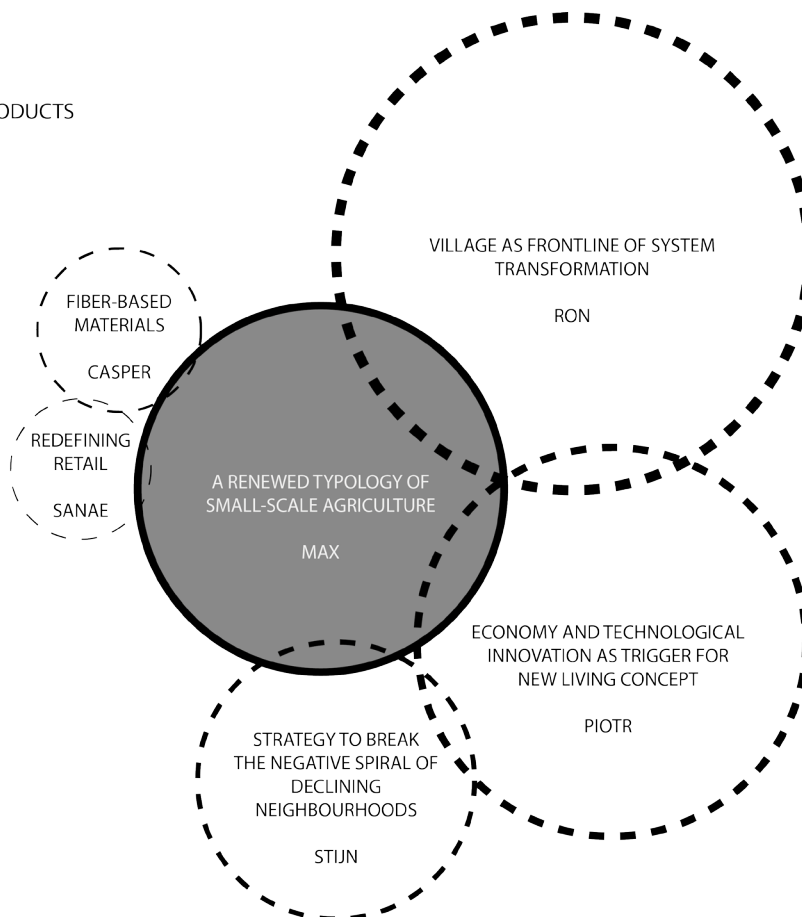
ARCHITECTURE AS A MOTIVATOR FOR A NEW FORM OF AGRICULTURE

ecological, social and economic benefits for the area



A RENEWED TYPOLOGY OF SMALL-SCALE AGRICULTURE ENSURES A SUSTAINABLE BALANCE WITHIN THE GROWING INDUSTRY AND THE CHANGE OF THE LANDSCAPE

MATERIALS AND PRODUCTS



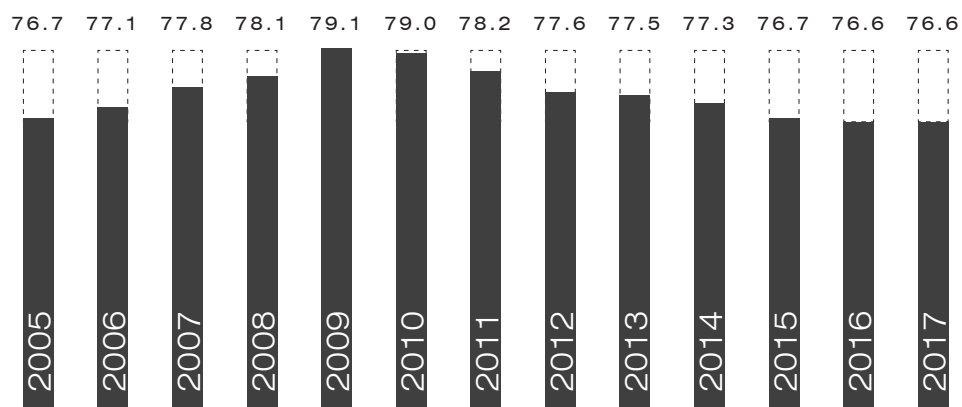
ECONOMY, ORGANISATION
AND SOCIETY

2. PROJECT SPECIFICATIONS

HYPOTHESIS

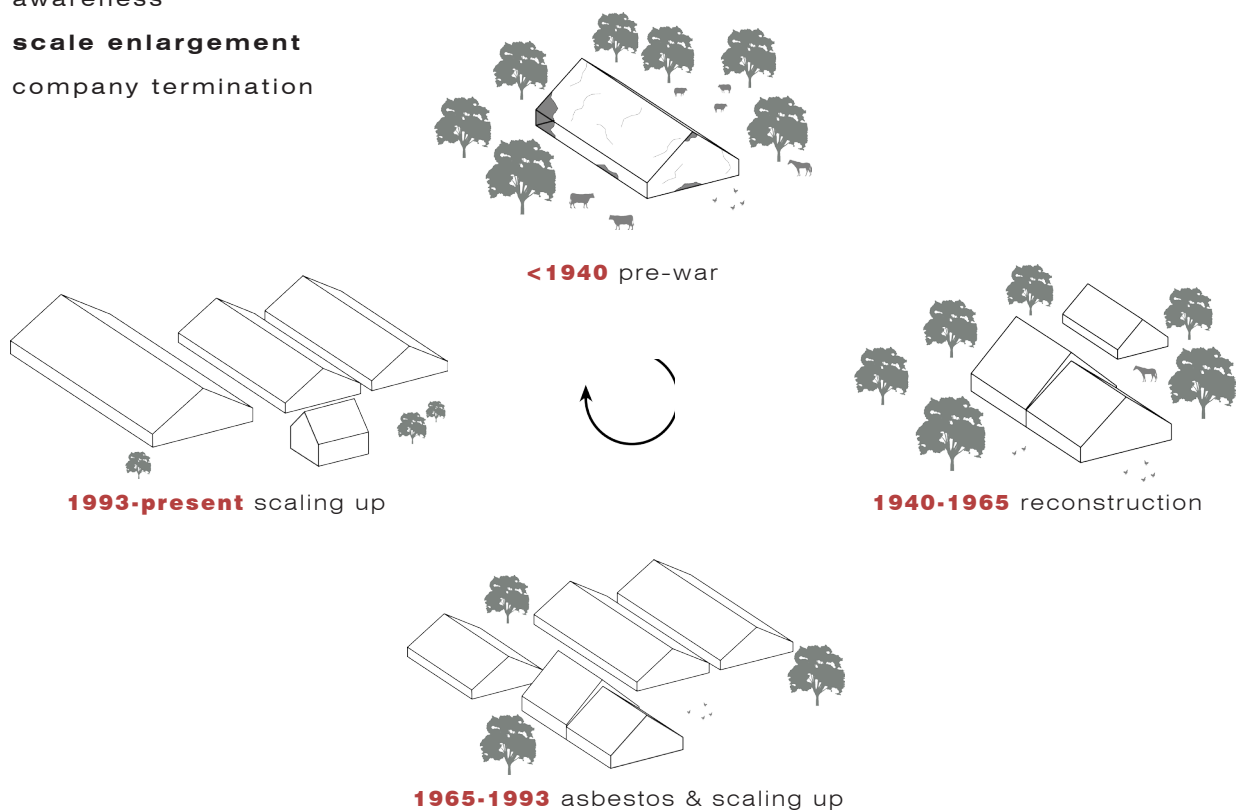
Within the typology of the current, declining agricultural ideology, architecture will form the framework for a system change that contributes to the social, ecological, and economic needs for future agriculture and the current landscape

- awareness
- scale enlargement
- company termination



Average meat consumption per person (kg)

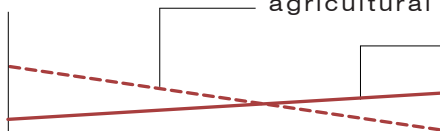
- awareness
- scale enlargement
- company termination



- awareness
- scale enlargement
- **company termination**

Municipality	total agricultural development 2012 (m2)	released agricultural buildings 2012-2017 (m2)	released agricultural building forecast 2017-2030 (m2)	total agricultural building forecast 2030 (m2)	percentage of change
BERGEN OP ZOOM	144.056	15.961	50.082	78.013	54%
BEST	188.448	17.334	83.096	88.018	47%
BREDA	278.464	42.187	85.666	150.611	54%
CUIJK	278.597	26.264	86.298	166.035	60%
HAAREN	408.183	114.802	147.265	146.116	36%
HALDERBERGE	227.855	37.727	75.460	114.668	50%
HELMOND	65.841	23.273	18.384	24.184	37%
LANDERD	459.037	61.766	146.478	250.793	55%
LOON OP ZAND	156.916	19.661	67.681	69.574	44%
MEIJERIJSTAD	1.631.910	202.131	48.9876	939.903	58%
NUENEN, GERWEN, N.W.	156.635	18.331	72.838	65.466	42%
SOMEREN	930.454	85.850	285.290	55.9314	60%
SON EN BREUGEL	128.255	7.006	46.888	74.361	58%
TILBURG	215.364	39.725	90.371	85.268	40%
VELDHOVEN	57.305	10.171	14.625	32.509	57%
VUGHT	54.267	7.917	15.481	30.869	57%
WAALRE	43.010	6.235	12.823	23.952	56%
WOUDRICHEM	167.521	12.966	29.913	88.819	53%
ZUNDERT	725.971	194.357	248.058	283.556	39%

decreasing number of
agricultural businesses

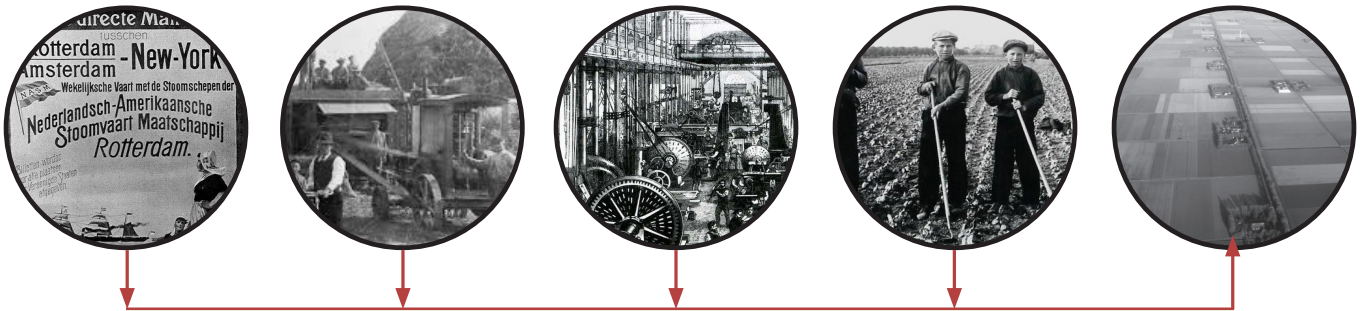


nationally produced agricultural
products remain the same or grow



- **system change**

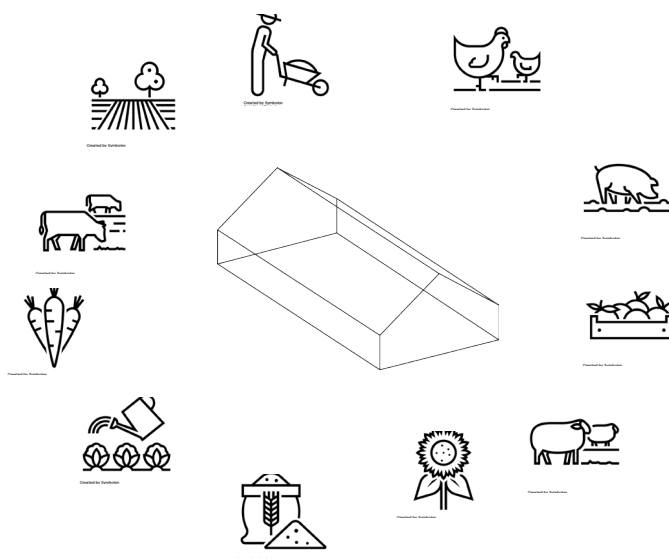
self-sufficient



- **system change**

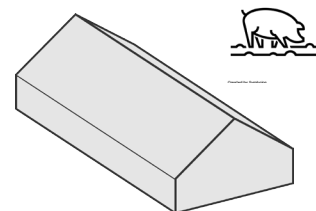
self-sufficient

TRANSPARENT & EXTROVERT



The farm from the past has various activities and production processes

CLOSED & INTROVERT



The current farm is characterized by a closed, large-scale production process of one product

PULLING THE THREADS OF AGRICULTURE DEVELOPMENT THROUGH RESPONSIBLE ARCHITECTURE

- **Architecture has unique opportunity in addressing and understanding the needs of the farmer**

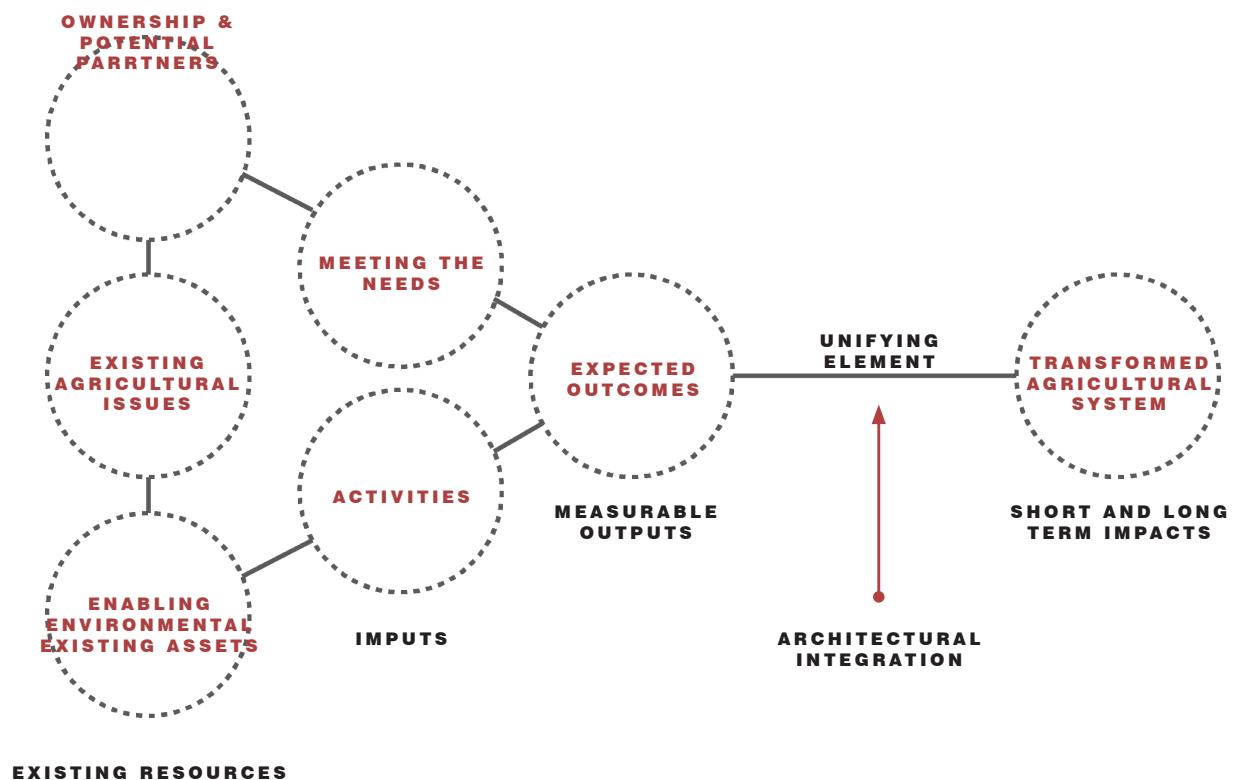
Since architecture is focused on problem solving and critical thinking in consideration of the needs of the users (people), a pro-farmer architectural approach can significantly contribute to these domino-effects of socio-economic issues.

- **Architecture makes better communities, built environment**

The potential of architecture as a powerful instrument in creating greater impact of development is probable especially in terms of achieving the sense of community in the agricultural system and incorporating the concept of transformation.

- **Architecture as an identity**

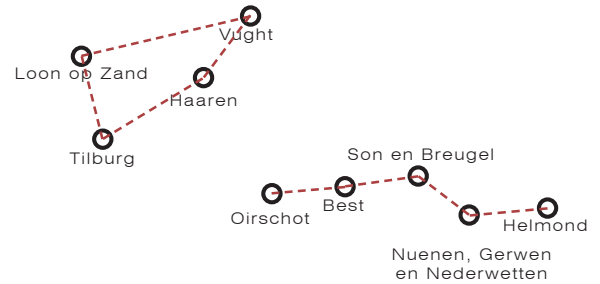
In connecting with people, architecture creates an identity for the agriculture by uplifting the image of the sector.



● **INTEGRATING A RESPONSIBLE ARCHITECTURAL SOLUTION**

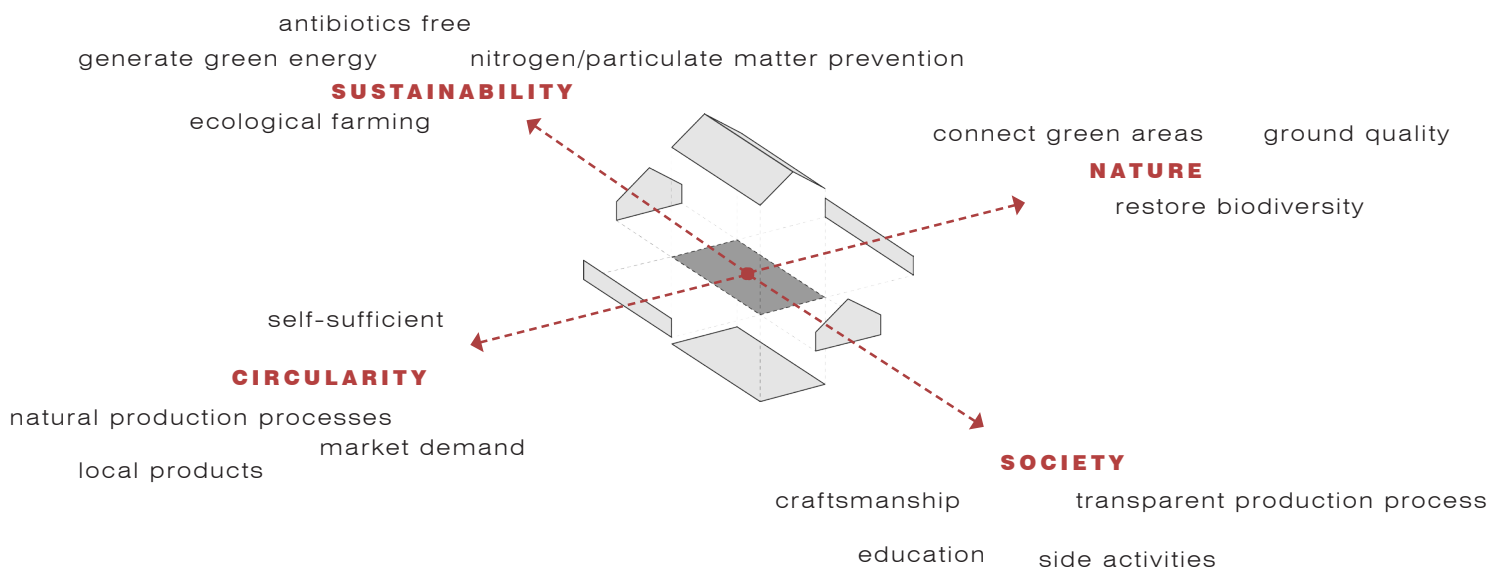


IMPLEMENTATION

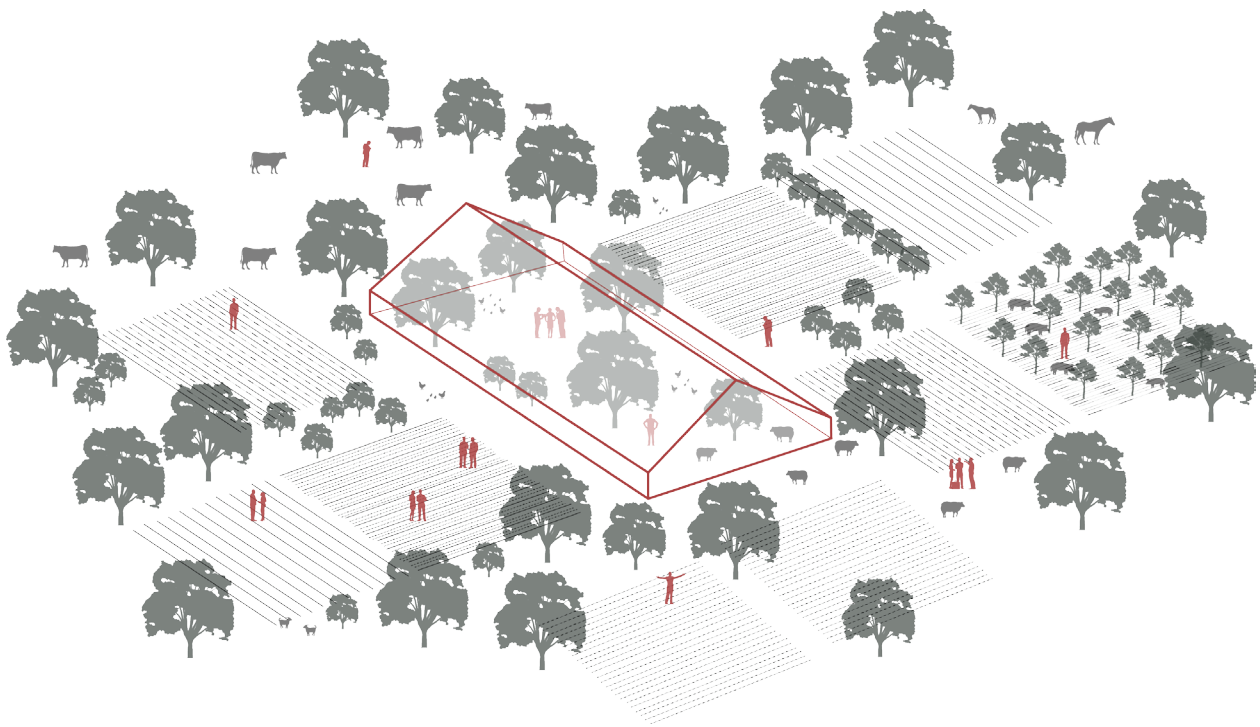


REPLICABLE TO CREATE LASTING RELATIONSHIPS

THE FARM STRIVES FOR TRANSPARENCY



pulling the threads of agriculture development through responsible architecture

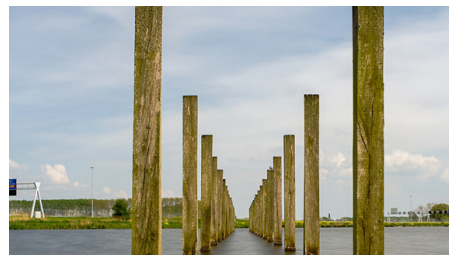


reference projects

Fabian Knecht - isolation



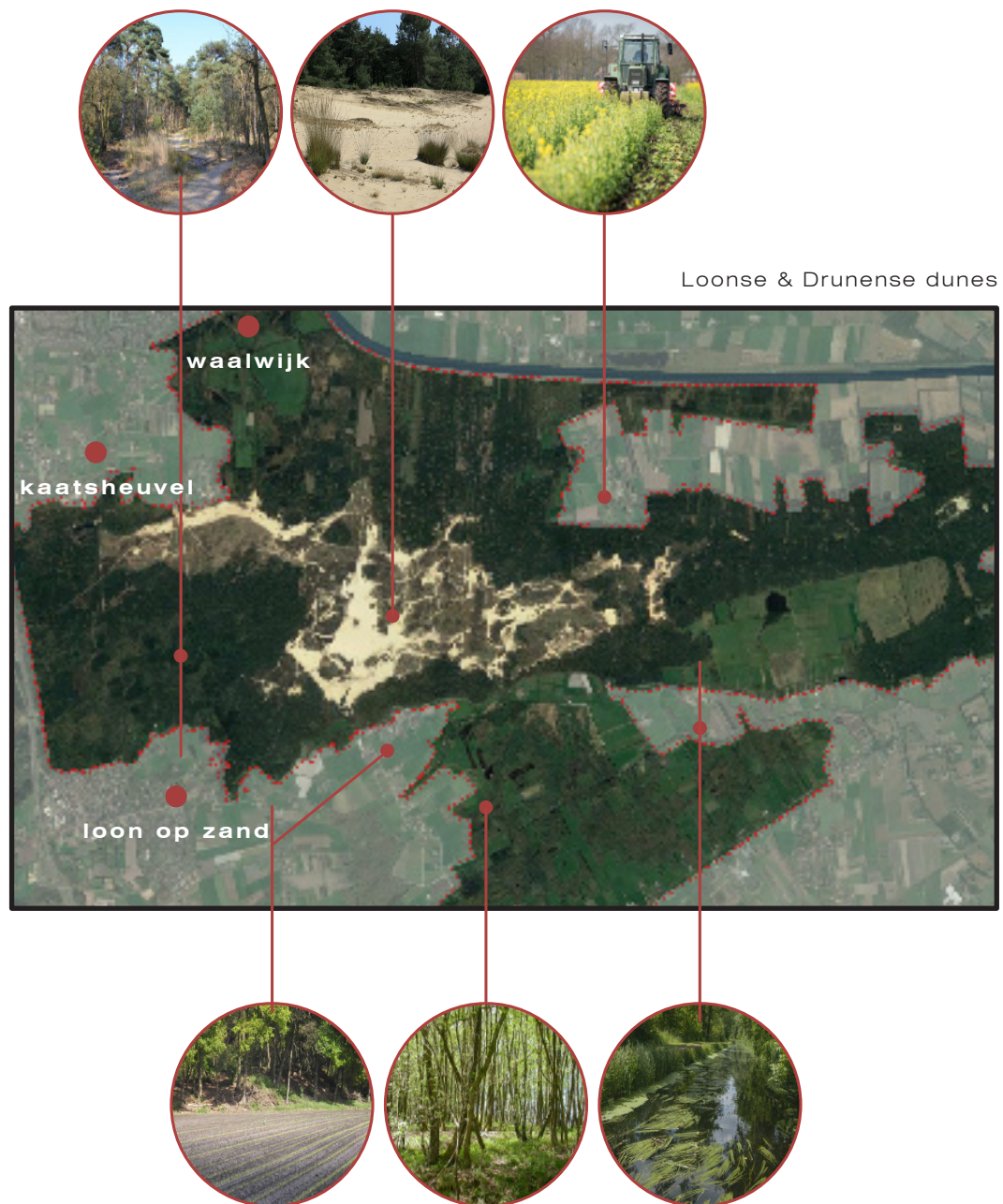
Raaaf Architects - bunker 599

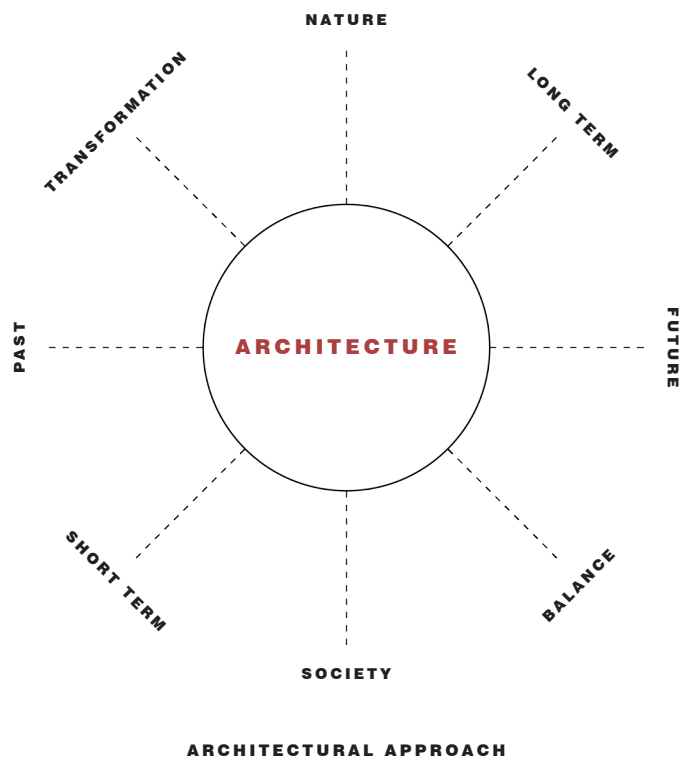
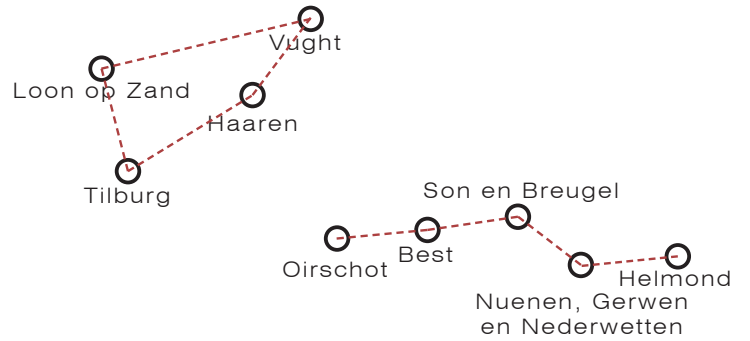
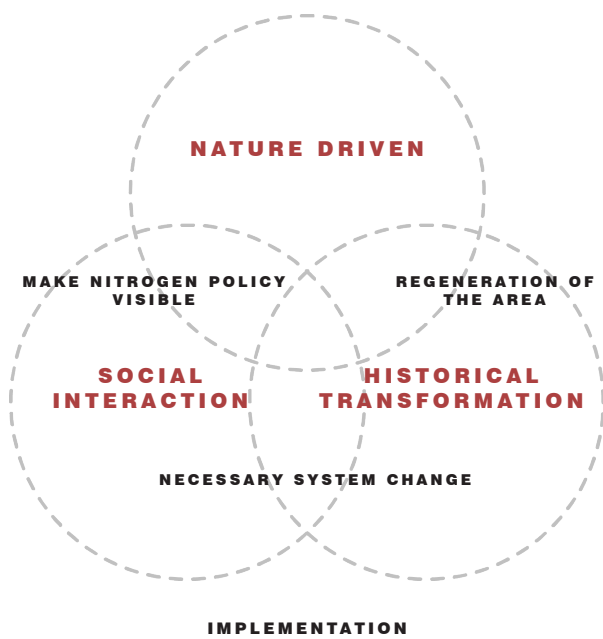


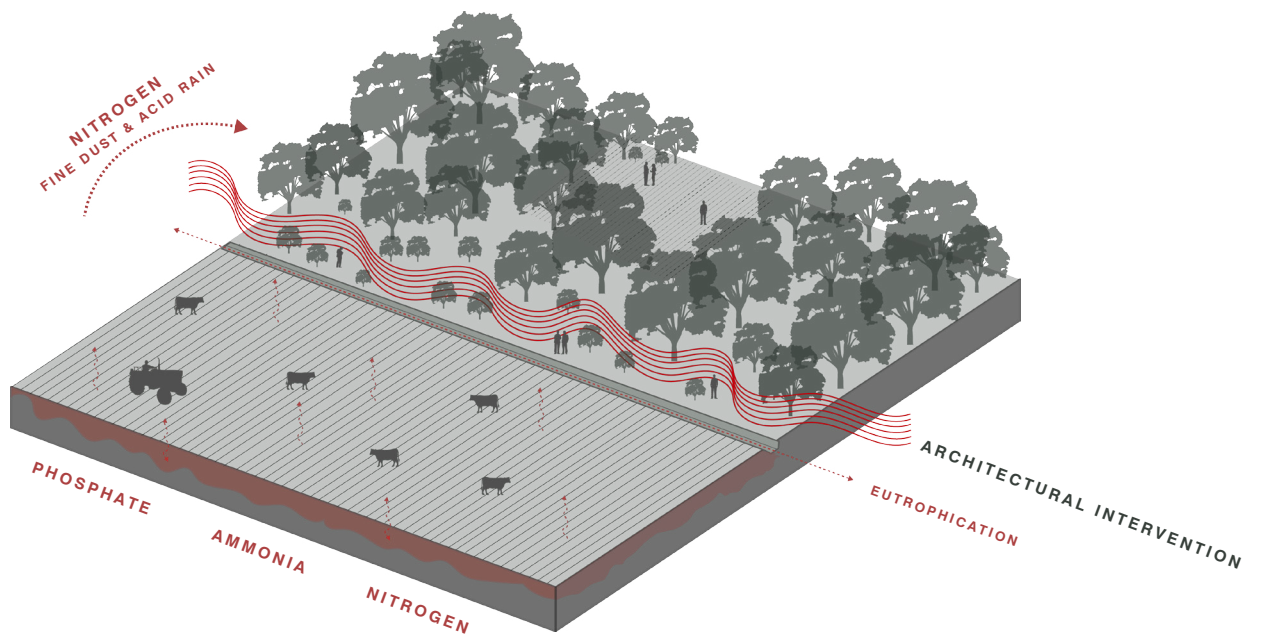
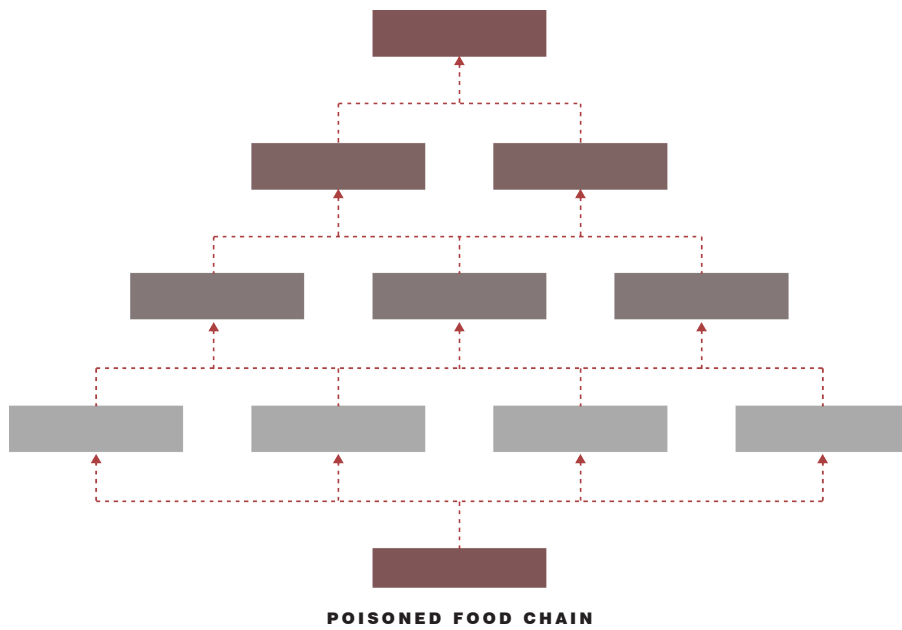
3. PROJECT SPECIFICATIONS COMPLEMENTATION

HYPOTHESIS

Architecture is the social and ecological connection for the natural transformation resulting from the decline of agriculture and responds to the question of today and the answer of tomorrow.





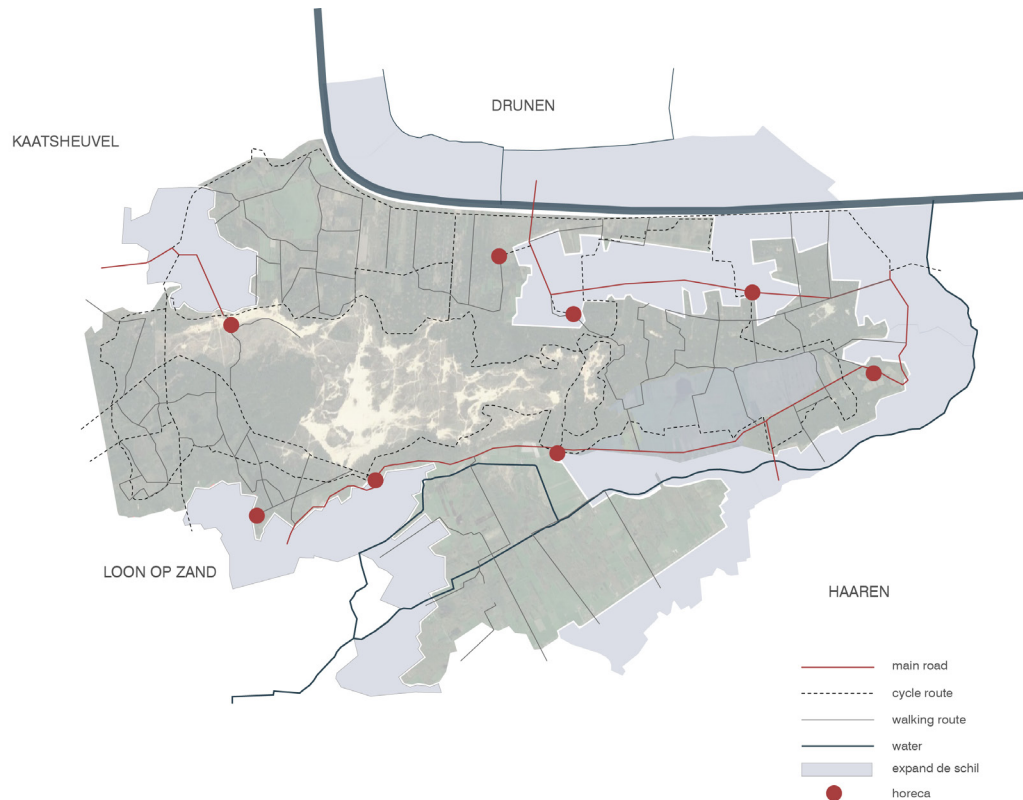


4. RESEARCH

HYPOTHESIS

Architecture forms a social and ecological system for the increasing vacancy within the agricultural sector around the Loonse en Drunense dunes, whereby it frames the collective balance between increasing recreational pressure and the large-scale sustainability of the area.

● LOONSE EN DRUNENSE DUNES

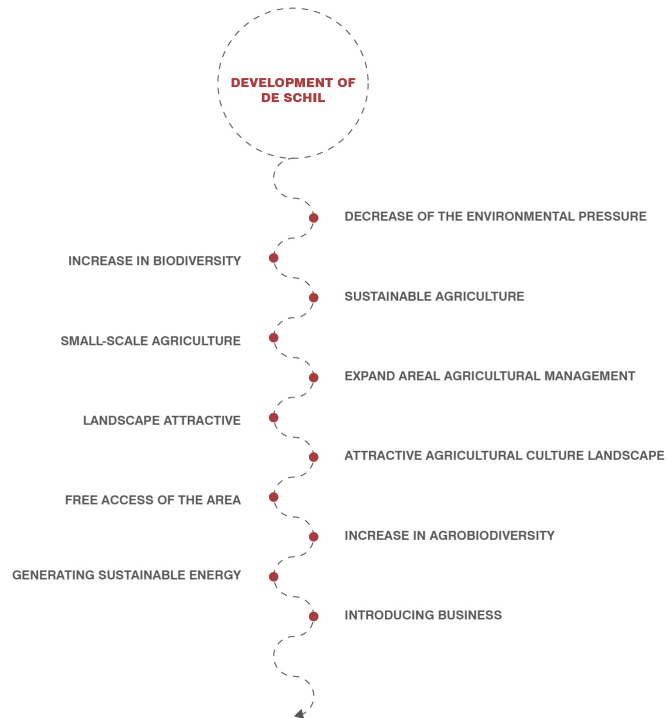


• DUINBOEREN VS HERENBOEREN

DUINBOEREN



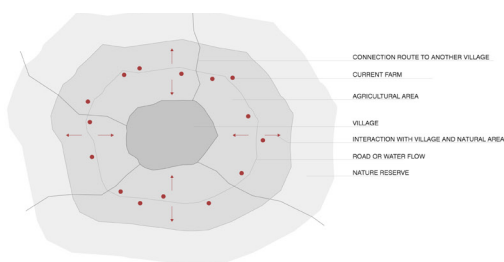
HERENBOEREN



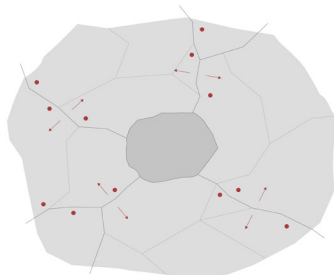
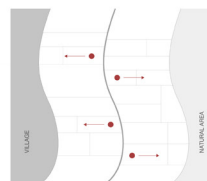
De schil:

environmental pressure must be reduced and (agro)biodiversity must be raised to form a buffer for increasing recreation

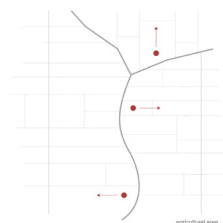
INTEGRATING A RESPONSIBLE ARCHITECTURAL SOLUTION

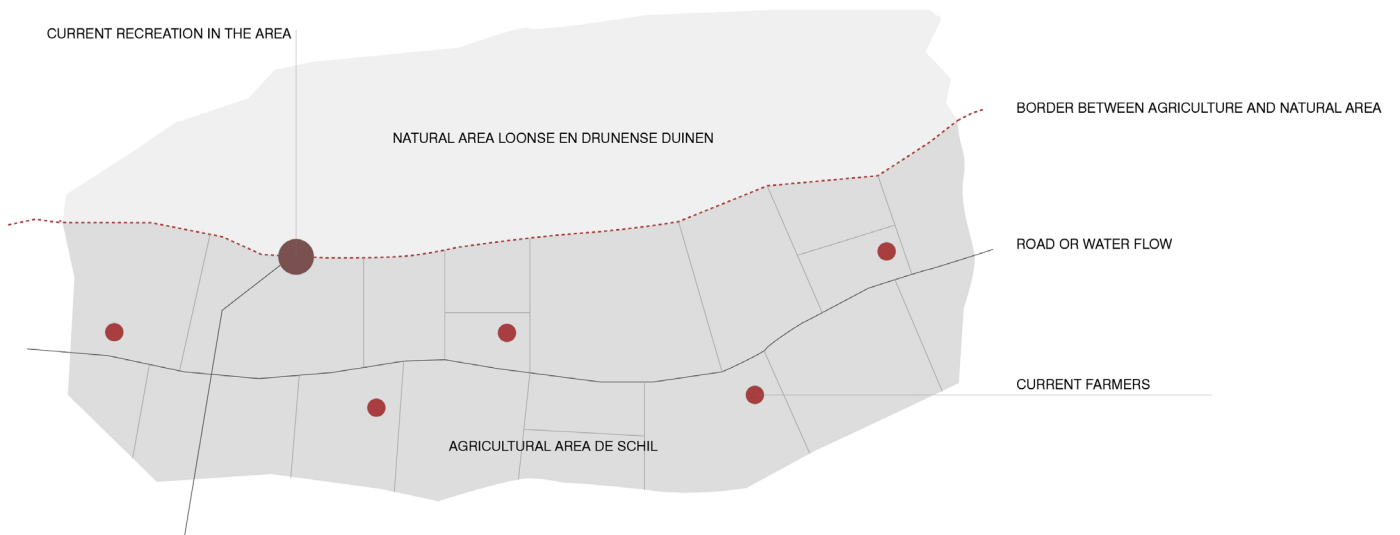


IURROUNDED BY AGRICULTURE AND NATURE AREA
N TO VILLAGE AND / OR NATURAL AREA

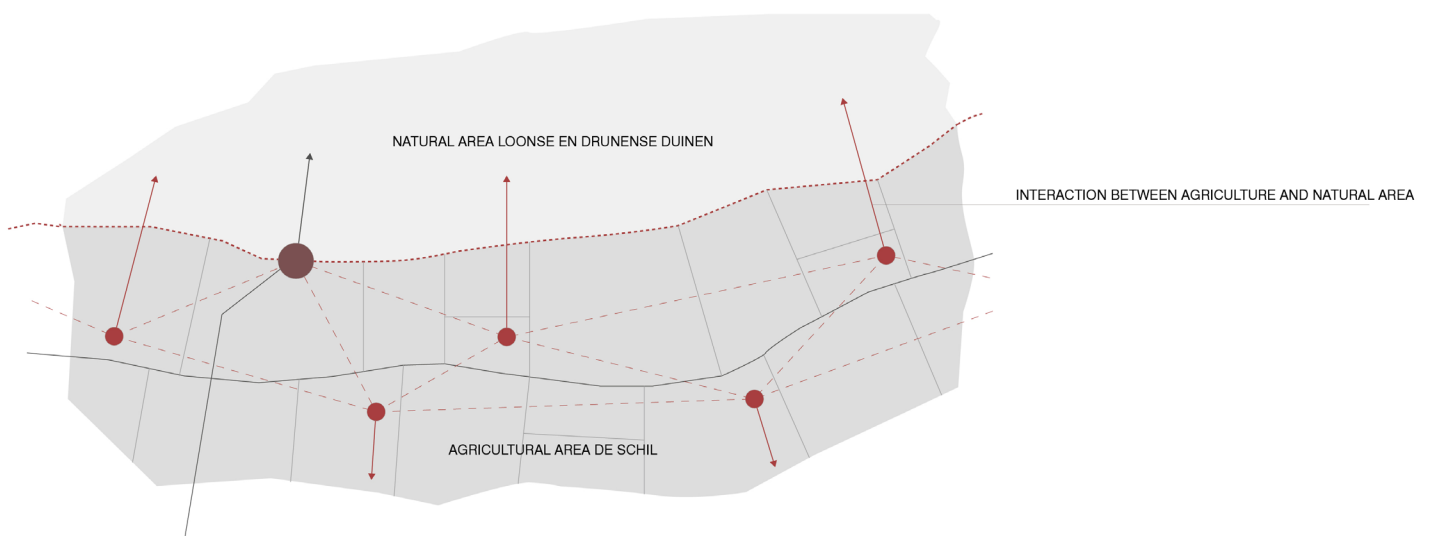


IURROUNDED BY AGRICUL-

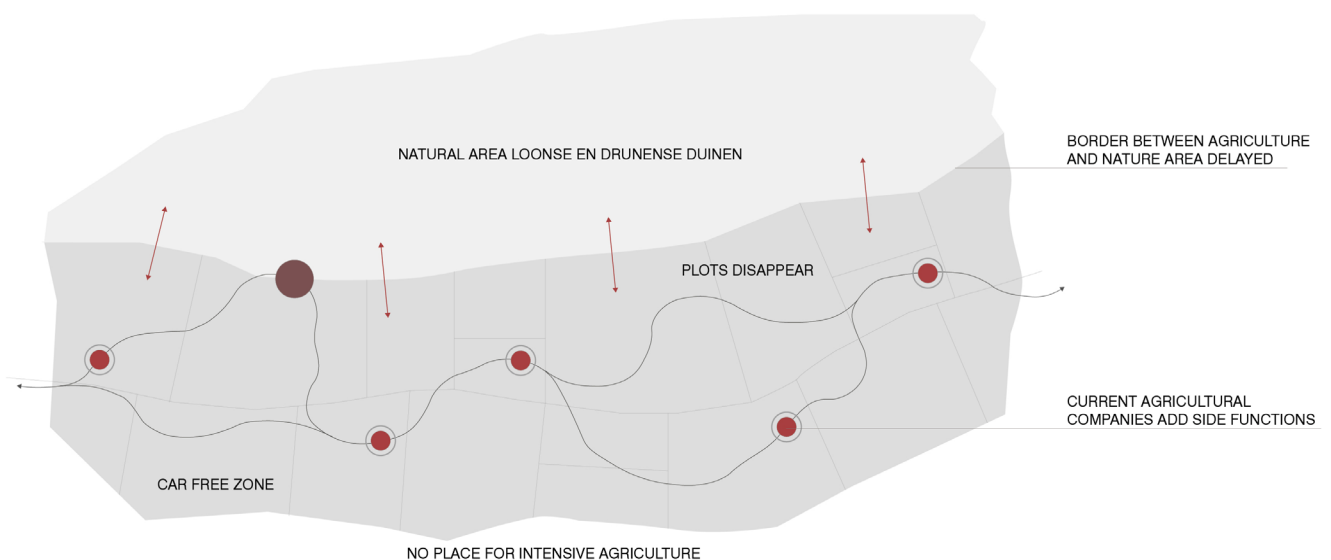




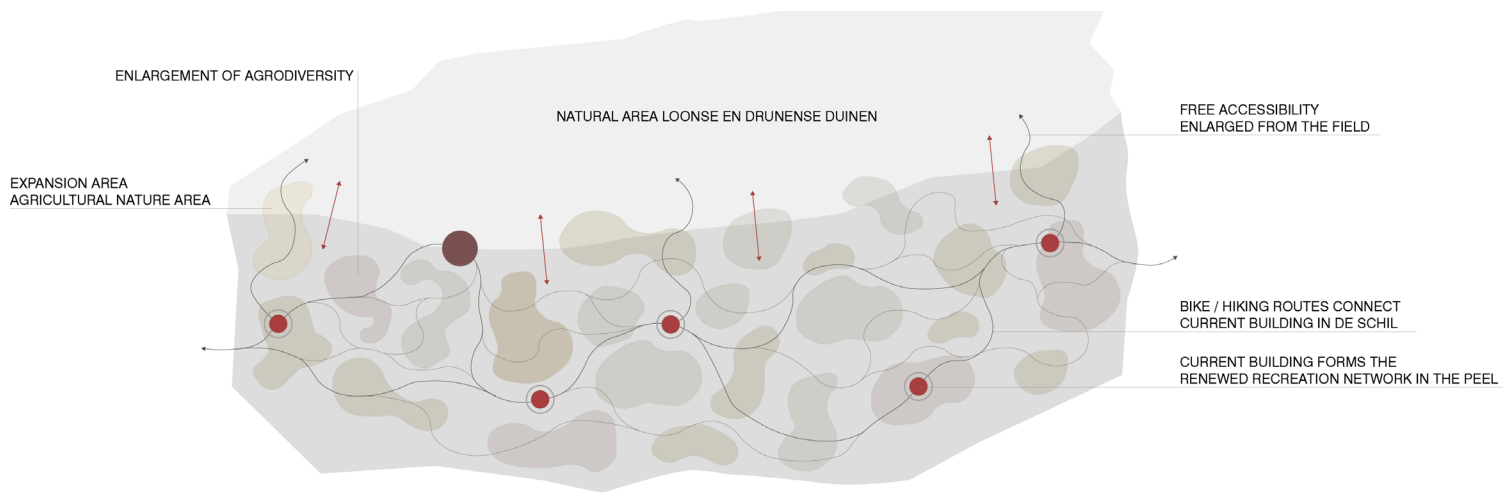
CURRENT SITUATION



CONNECTION

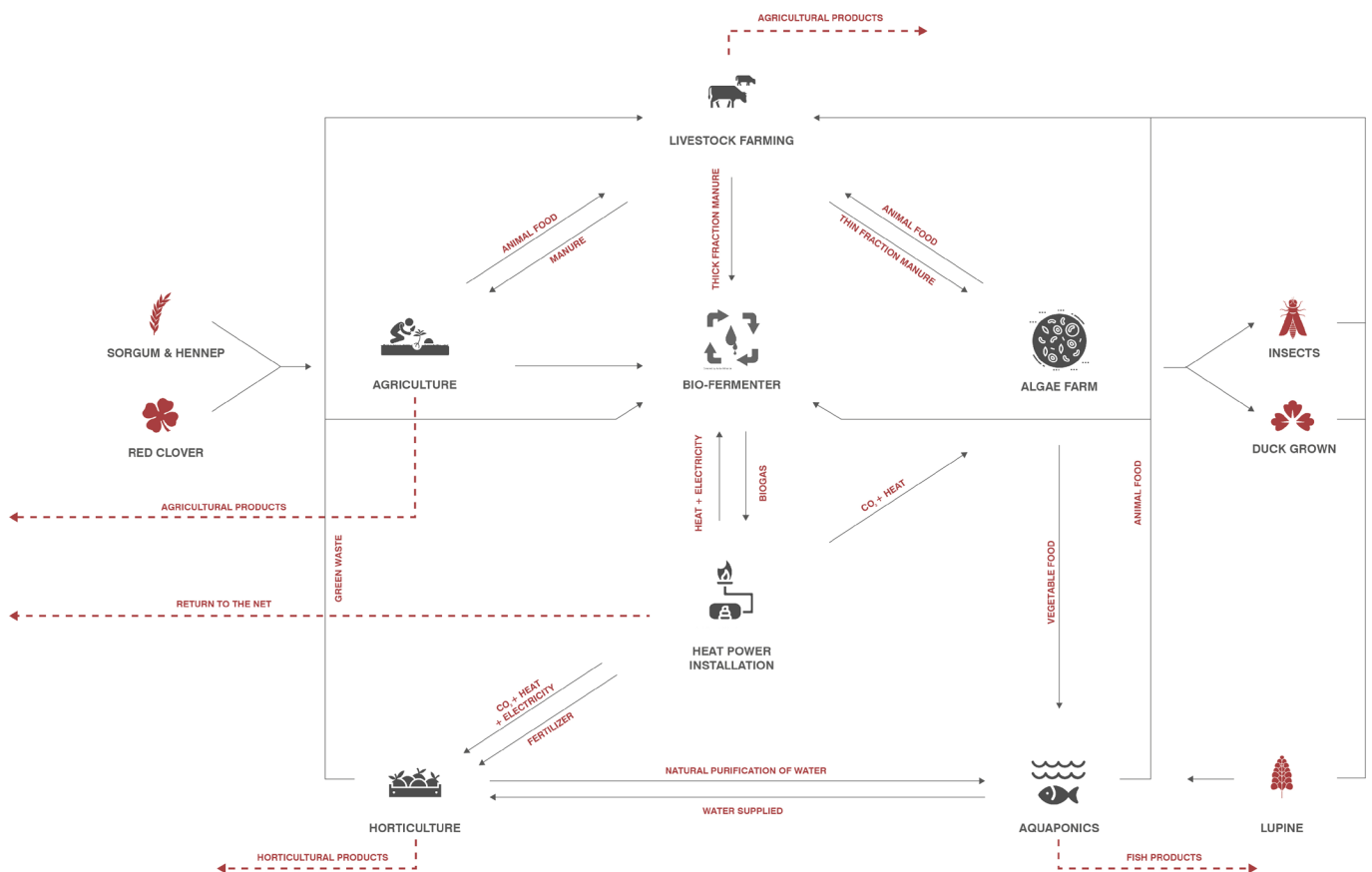


RECREATIVE CONNECTION






INTERACTIVE COLLECTIVE BETWEEN NATURE AND AGRICULTURAL AREA

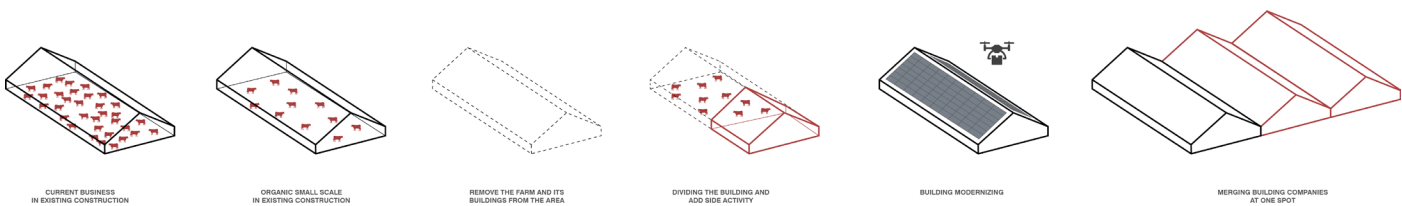
● CIRCULARITY



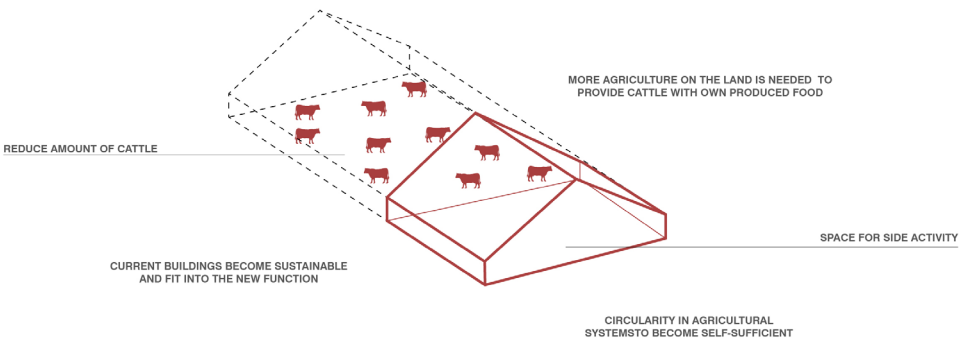
● INTENSIVE - ORGANIC

	INTENSIVE FARMING	ORGANIC FARMING		
	STABLE DIMENSIONS	NO REQUIREMENT	STABLE DIMENSIONS	6 M2 PER ANIMAL
	OUTDOOR POSSIBILITIES	> 120 DAYS> 6 HOURS PER DAY	OUTDOOR POSSIBILITIES	ALWAYS
	FOOD	NO REQUIREMENT	FOOD	<40%
	FOOD PRODUCTION OWN COMPANY	NO REQUIREMENT	FOOD PRODUCTION OWN COMPANY	>60%
	STABLE DIMENSIONS	0.8 M2 PER PIG	STABLE DIMENSIONS	INCREASING TO 1.3 M2 PER PIG
	DAYLIGHT	NOT PRESENT	DAYLIGHT	OBLIGATED
	OUTDOOR POSSIBILITIES	NOT PRESENT	OUTDOOR POSSIBILITIES	REQUIRED (75% COVERED)
	FOOD PRODUCTION OWN COMPANY	NO REQUIREMENT	FOOD PRODUCTION OWN COMPANY	>20%
	STABLE DIMENSIONS	11-13 ANIMALS PER SURFACE	STABLE DIMENSIONS	6 ANIMALS PER SURFACE
	DAYLIGHT	NOT PRESENT	DAYLIGHT	OBLIGATED
	OUTDOOR POSSIBILITIES	NOT PRESENT	OUTDOOR POSSIBILITIES	OBLIGATED
	FOOD PRODUCTION OWN COMPANY	NO REQUIREMENT	FOOD PRODUCTION OWN COMPANY	NO REQUIREMENT

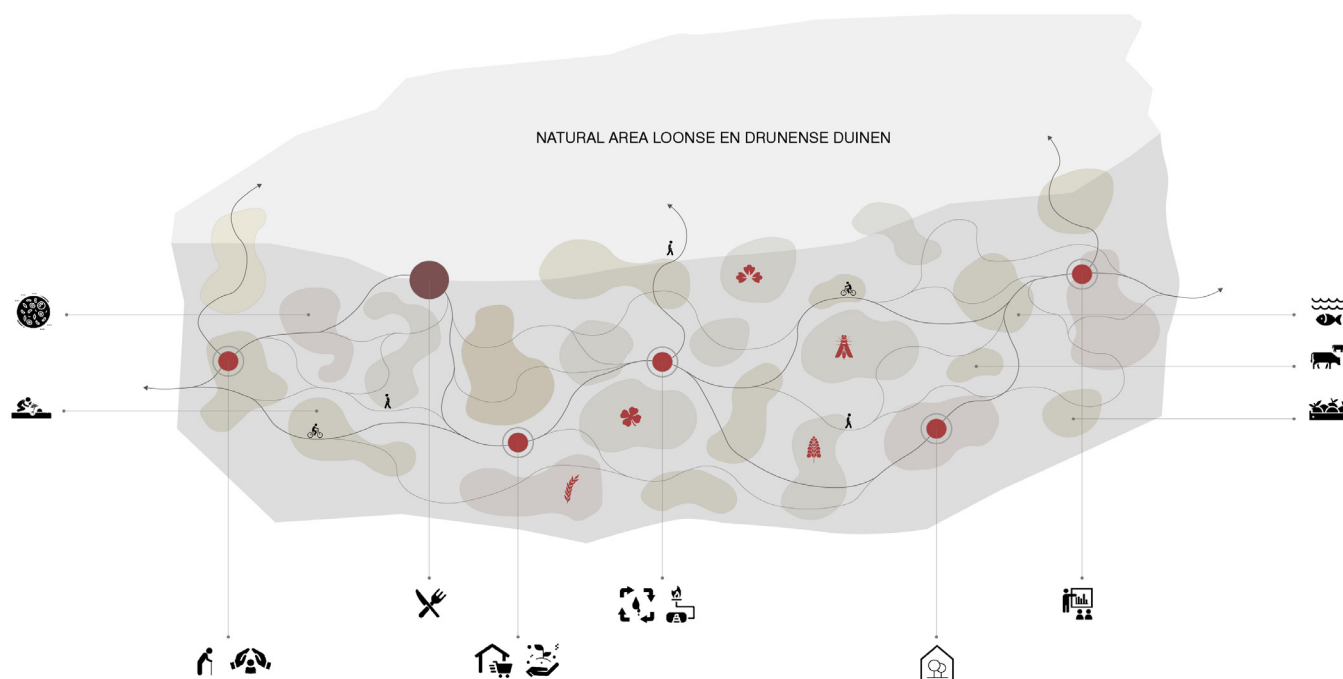
● SUSTAINABLE ORGANIC AGRICULTURE



BIOLOGICAL AGRICULTURE



● SITUATION



BUSINESS DIVERSITY IS INTERACTIVE COLLECTIVE

Because the bicycle and walking routes connect the farms, it is possible to grow or reduce the system

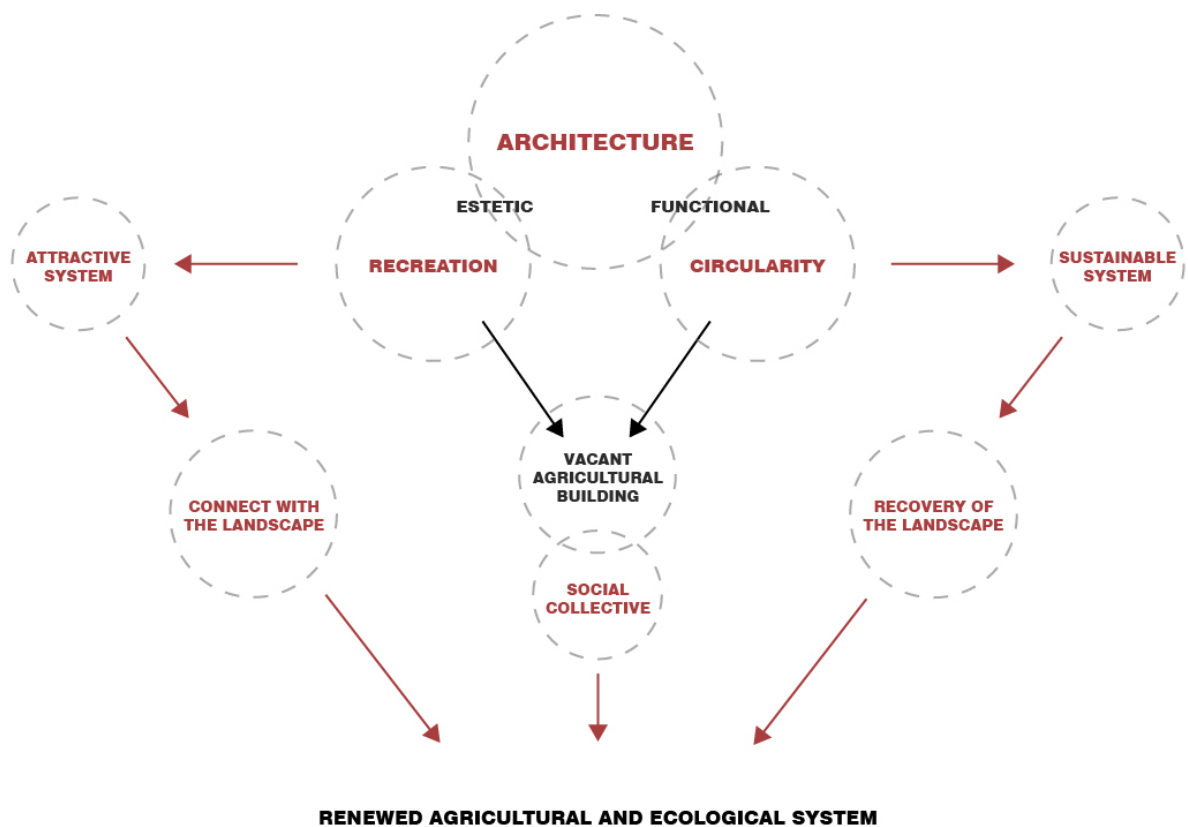
COMPANIES CONNECT TO SIDE FUNCTION

- Botanical Garden
- Organic supermarket
- Living collective for retired farmers
- Bio-fermenter + heat power installation
- Education / business location

NO PLACE FOR:

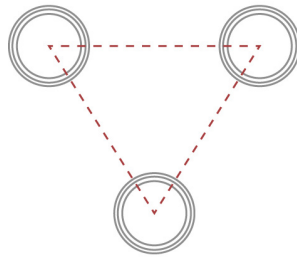
- Intensive livestock farming and tree cultivation
- Caravan parking
- Camping places
- Cars
- Care farms (abundance)

● INTEGRATING A RESPONSIBLE ARCHITECTURAL SOLUTION



● CASUS

TRANSFORMATION OF THREE FARMS



THE BASIS OF A SYSTEM THAT CAN GROW AND SHRINK

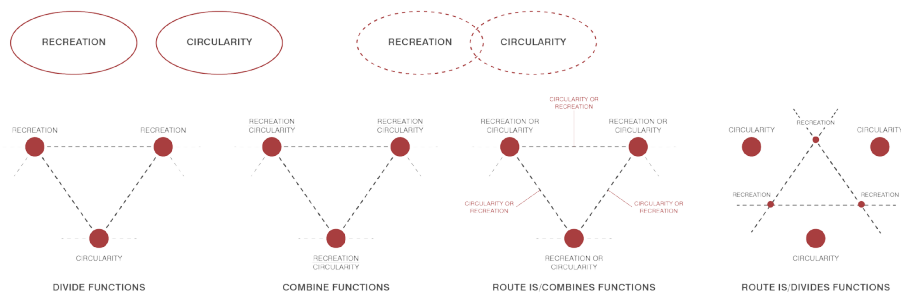
● REFLECTION

The research has shown that architecture is the pivot of future changes within the area. By integrating a circular system within an agricultural livestock farm, it can continue to operate in a sustainable, ecological way. This transformation is accompanied by the demand for increasing recreational pressure, in which the farm needs to open itself to visitors.

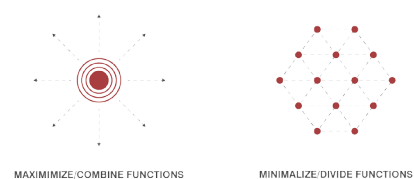
From this case study, a concept study was carried out into the various transformation options within an agricultural company. In this way it is possible to determine whether the current typology has the potential to be transformed into a yard in which visitors are invited to experience the circular process.

5. CONCEPTUAL DESIGN

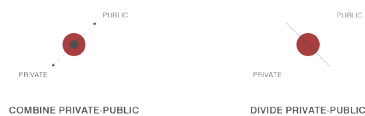
DIVIDE & COMBINE



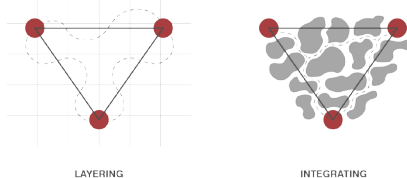
MAXIMIZE & MINIMIZE



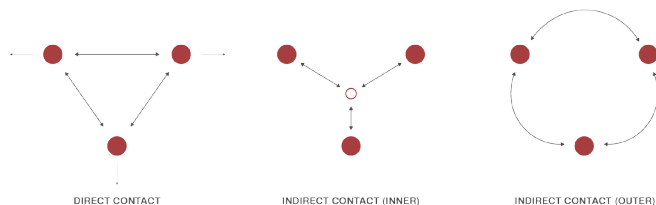
PRIVATE & PUBLIC



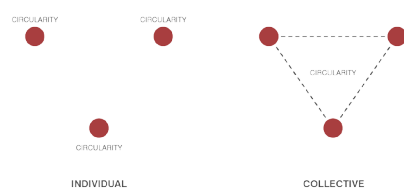
LAYERING & INTEGRATING



BUSINESS CIRCULATION



CIRCULARITY



Based on the research, it was decided to use The Brand area as a location for the elaboration of my concepts. These concepts are not location-specific, because this involves a sustainable system that can be applied at multiple locations in the Netherlands.

The circular system immediately forms the basis for the 3 concepts. This system ensures that the farmer can continue his business in a sustainable and ecological way and is thus integrated into the existing buildings that are now present at the agricultural business. The current buildings have a lot of potential to be transformed into a new form of agriculture in which the insertion of recreation plays an important role in making the area attractive to visitors.

De Brand is part of the Loonse and Drunense dunes and therefore also a Natura 2000 area. This means that it is a protected nature area, so building here is not a matter of course. Nevertheless, the choice was made to use this area, because it has a lot of potential to go through a change. The area has been used for wood extraction for years. The area was also parceled out after 1960 (in which a lot of wood was felled), creating so-called agricultural chambers. Yet the area does not seem to be popular to visitors, because it is difficult to walk through. Furthermore, the area is surrounded by agriculture, so there is a good chance to provide this area with more ecological and mobility quality through the transformation of the current farms.

Three surrounding farms have been selected for the development of the system. These farms are located on the 3 main roads that border this area. As a case study, one company was chosen to work out the new concepts. These concepts are a result of the spatial interpretation within the transformation of the renovated farms. Our own research shows that the elements required to introduce a circular system can easily be integrated within the current buildings. As soon as people want to enlarge this system, more buildings will have to be made available for this. That is why this is a transparent system in which the size can be determined and it is easy for several companies to connect with each other.

This takes into account the fact that the farmer has the freedom to choose for himself what recreation options are added to the renewed agricultural policy. These are therefore not (yet) included in the concept phase.

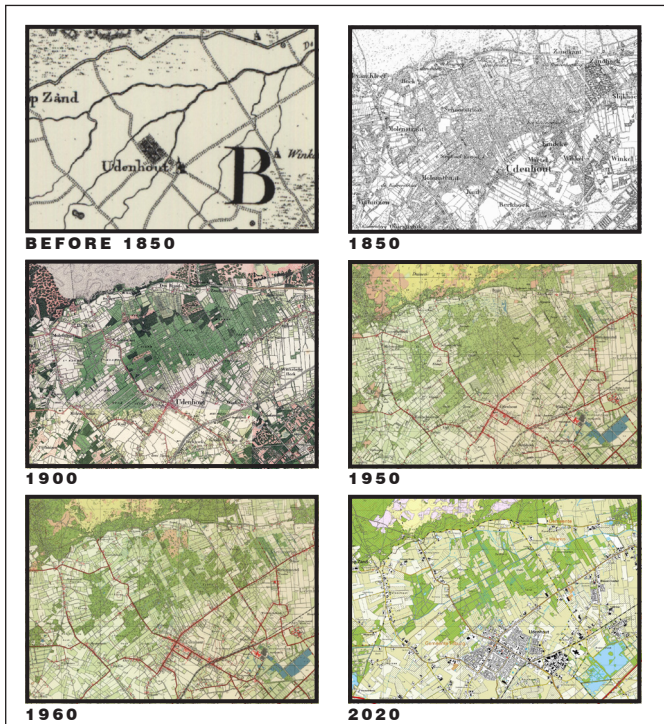
It is also important to remember that the various concepts are an automatic response to the landscape. This is partly due to the sustainability of farming, where people have fewer animals but, on the contrary, need more fields to grow their own food for both humans and animals.



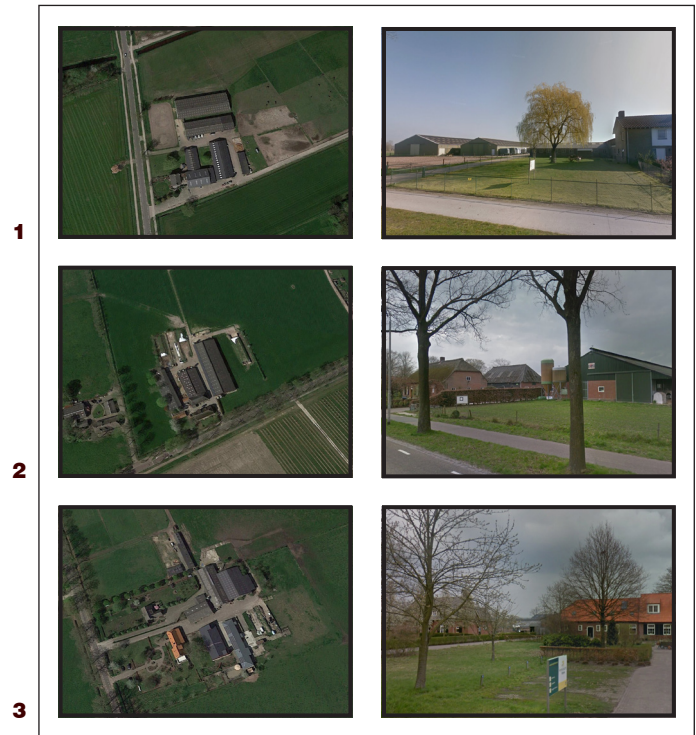
ELEMENTS FOR SUSTAINABLE CIRCULARITY



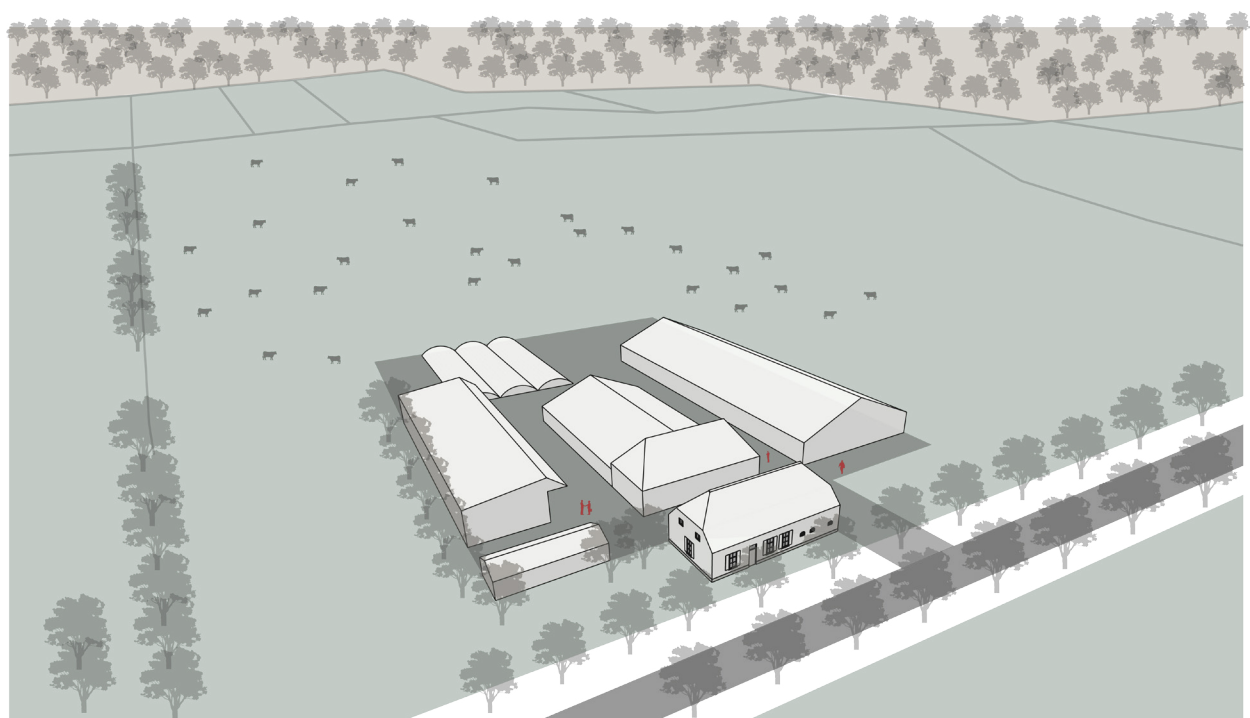
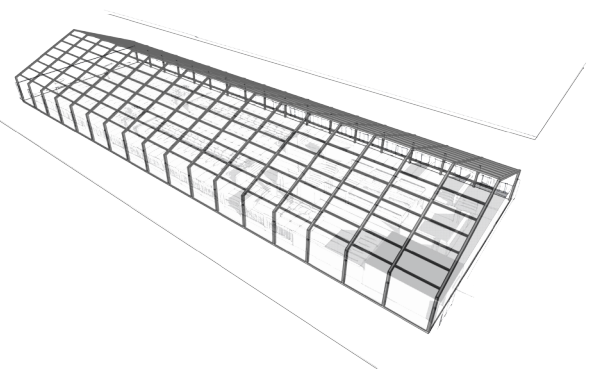
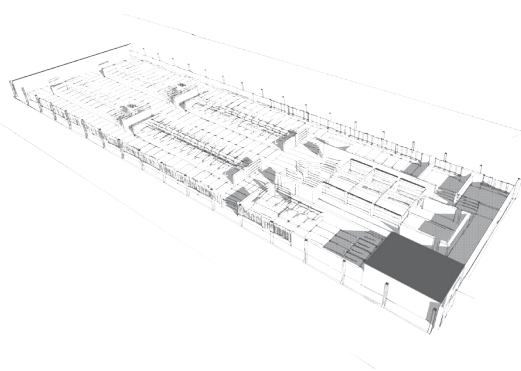
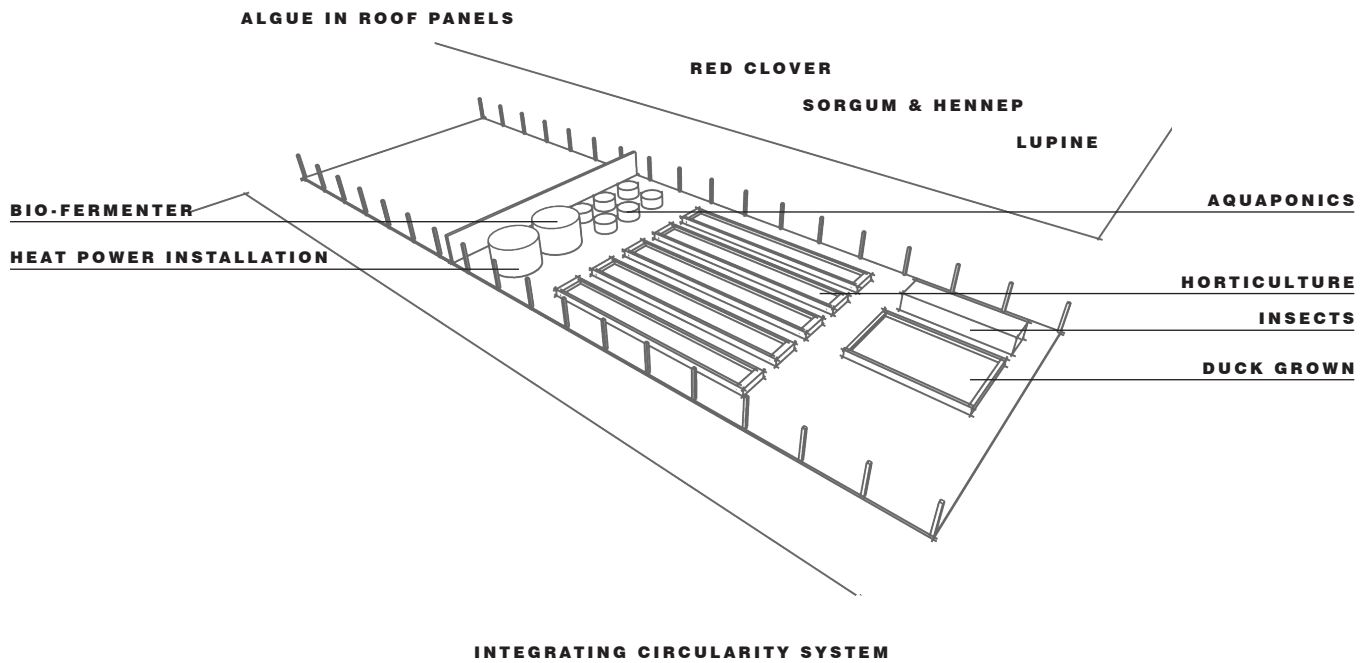
AREA THE BRAND



AREA DEVELOPEMENT



FARMS



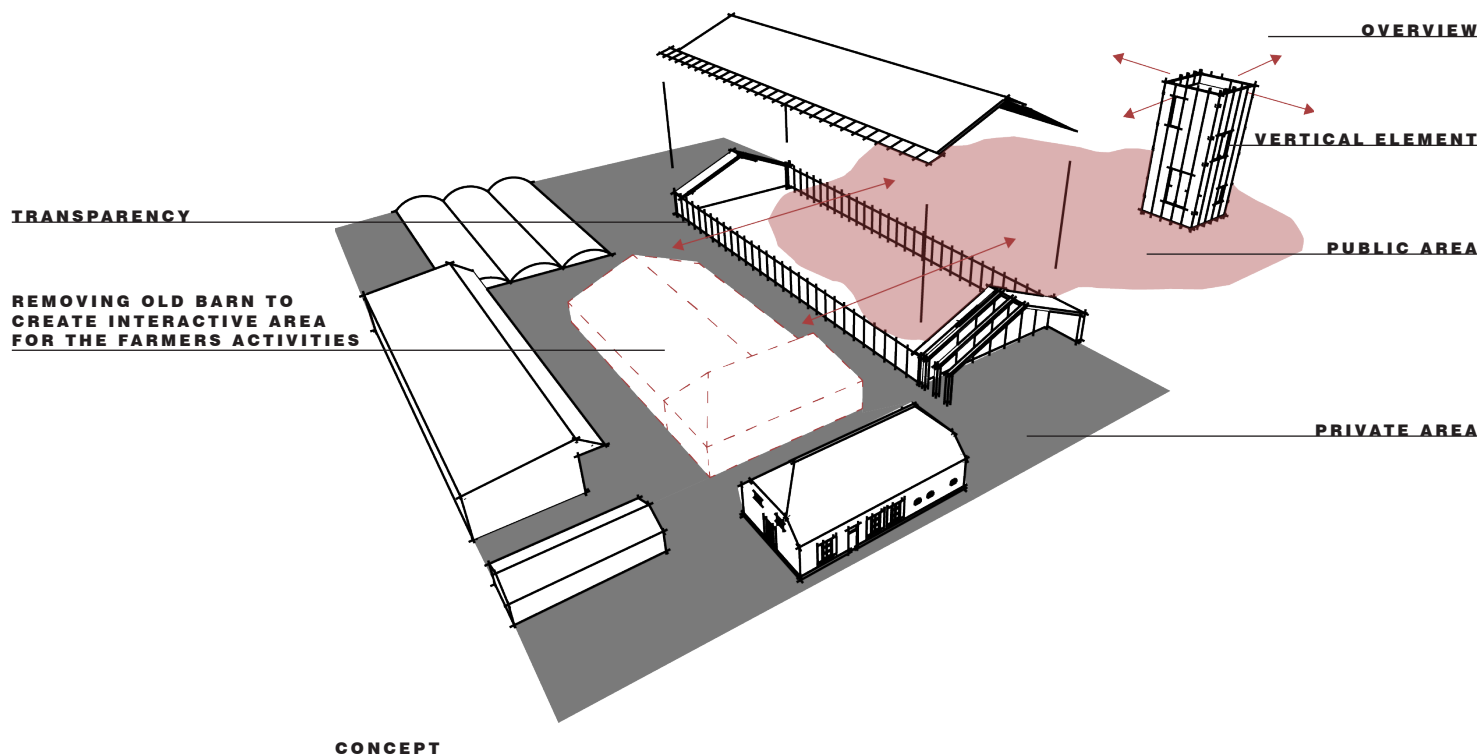
REPLACEMENT

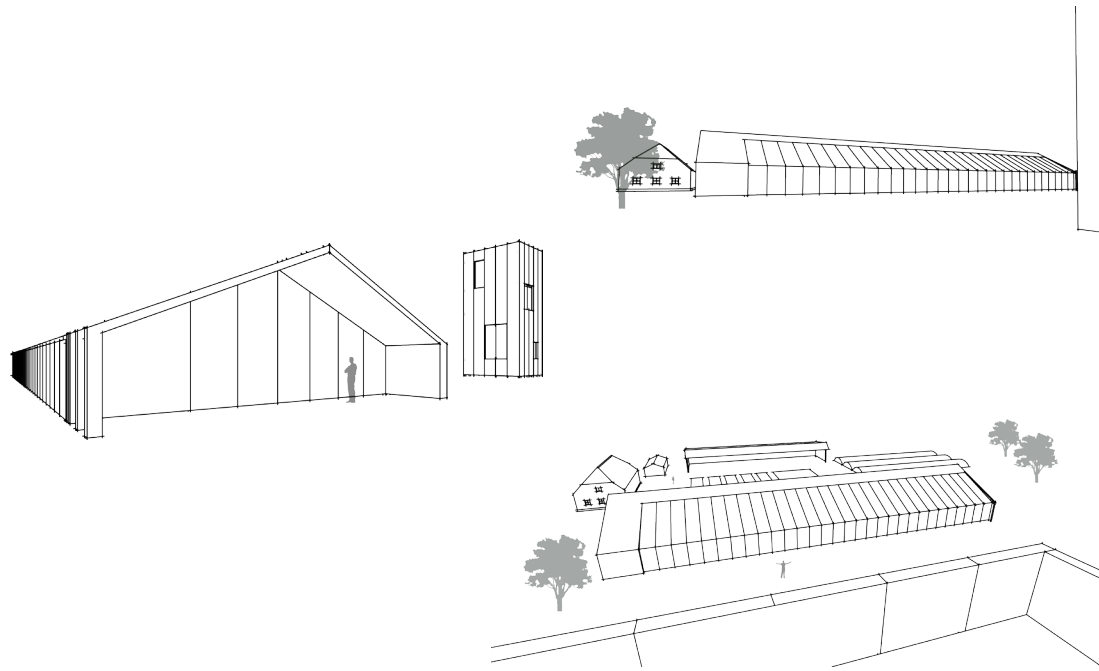
The first approach to the renewed concept is based on the preservation of the current agricultural typology. The current barns do not have to be classified differently. The large cowshed, on the other hand, is laid out differently and partly set up for the public. In the large cowshed you can see the renewed circular system in combination with a recreational interpretation. Nevertheless, private and public remains separate, because the visitor does not have the possibility to enter the farmyard.

An additional element is added to make a spatial contrast to the current, typical buildings of the farmyard. This extra element (tower) forms a vertical object that ensures that a visually closed recreational zone is created around the new cowshed. This tower also serves to accommodate recreation by giving the visitor a place to experience the rural area and the farmyard from an elevated view. This contrast in buildings provides a new experience of the agricultural landscape.

Old barns in the centre of the plot are removed to create an open, transparent property that is visible from the transformed cowshed. This allows the visitor to experience up close what the daily activities of the farmer are, without disturbing the work.

The added agricultural areas are framed by the upper floor, so that they are placed in so-called rooms. This is in line with the current classification of the Brand. These extra lines in the landscape are crossed by flowing cycling / walking routes that lie as an extra layer on the landscape.





IMPRESSIONS



OVERVIEW

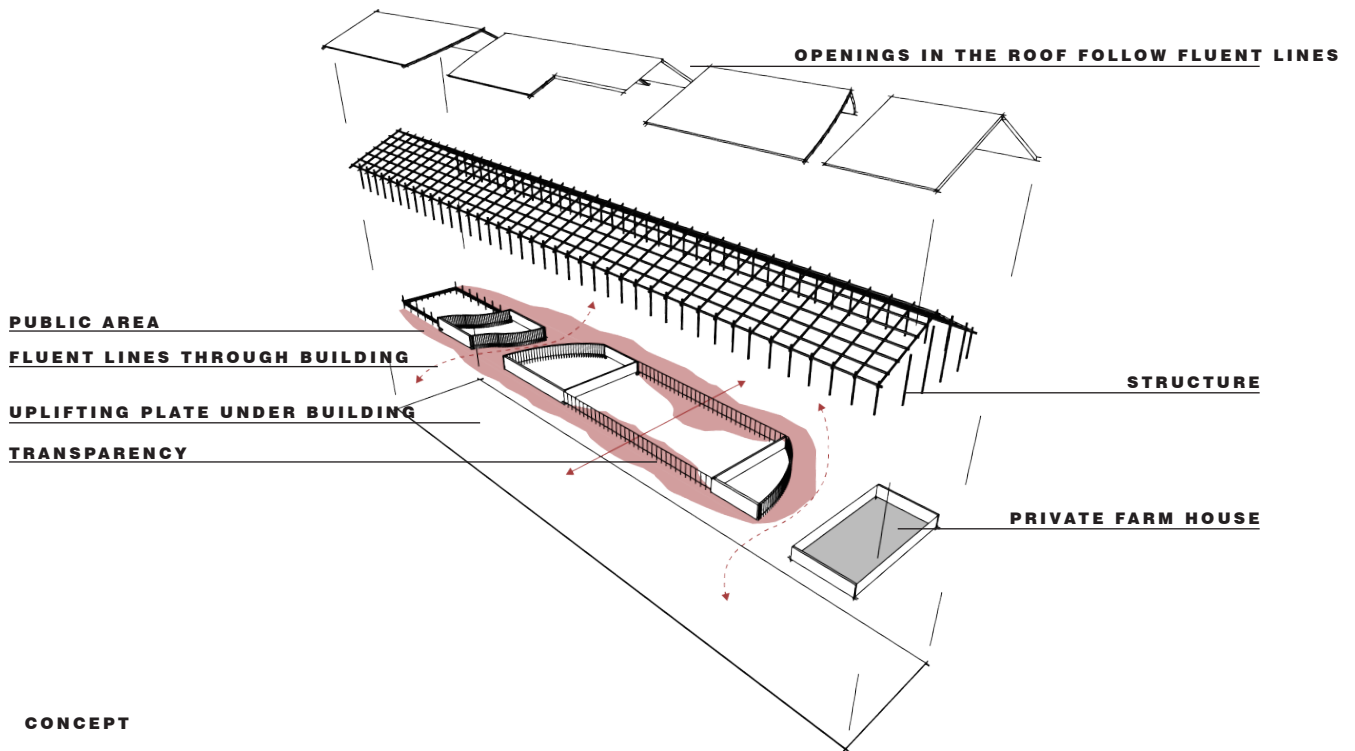
EXPAND

The second concept is based on a yard transformation in which all functions are combined in a long volume. This volume is clearly present in the landscape, but, unlike the mega stables in the area, it provides a new look at this agricultural interpretation.

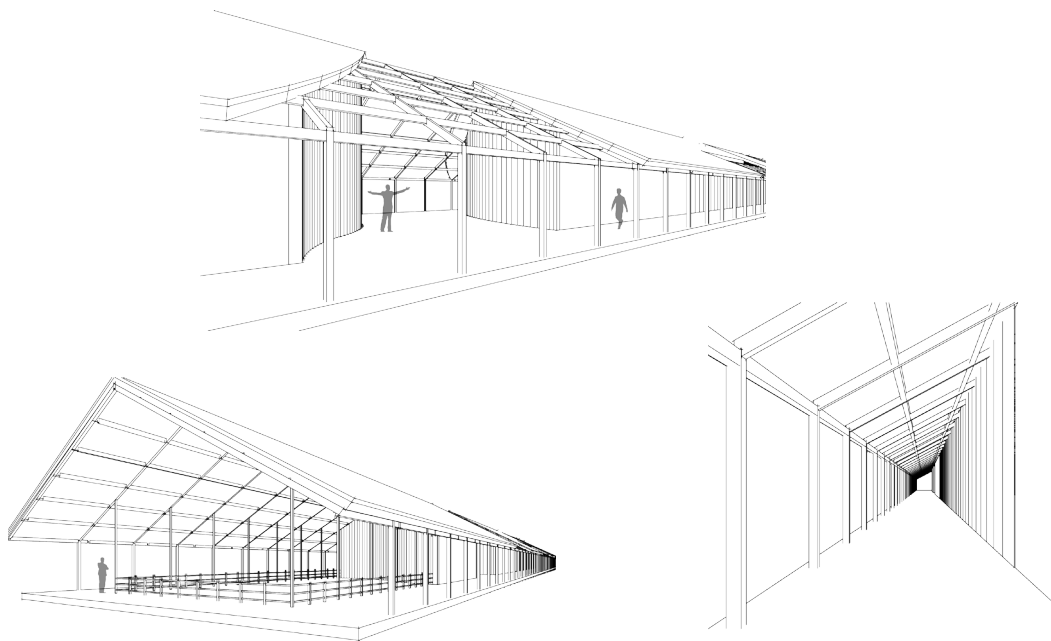
The building is characterized by its length. This length is accentuated by the rhythm that is reflected in the facade. Because of this rhythm of columns, the building seems to be open to the landscape. This is reinforced by slightly raising the building so that it appears to float on the terrain.

Within this volume, a dwelling house will also be realized for the farmer. The cattle will settle down at the tail of the building, so that the circulation between humans and animals literally goes through the building as a direct line.

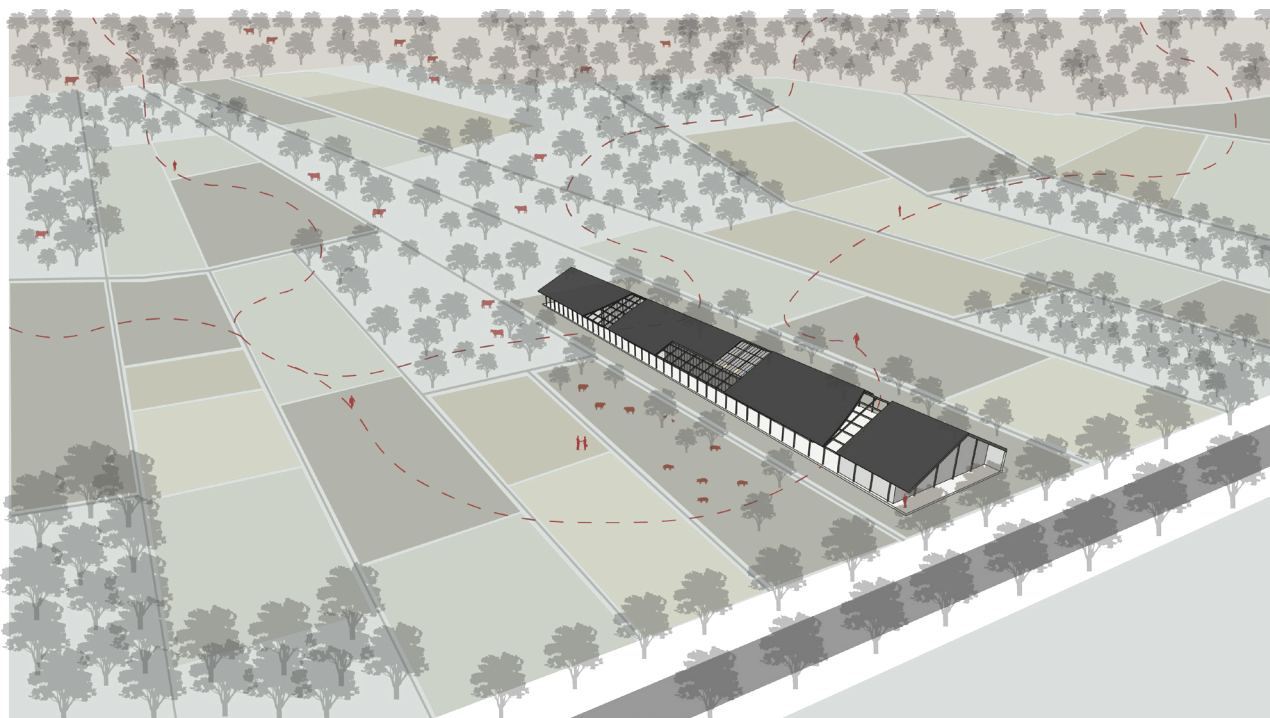
The power of the building is enhanced by changing the layout of the plots. Long lines are laid parallel to the landscape to integrate the building more into it. These long lines are again crossed with flowing cycling / walking routes that lie as an extra layer on the landscape. On the other hand, these flowing lines are included in the building in order to integrate the building more closely with the renewed routes in the landscape.



REFERENCEPROJECT: CONO - BEEMSTER KAASMAKERIJ



IMPRESSIONS



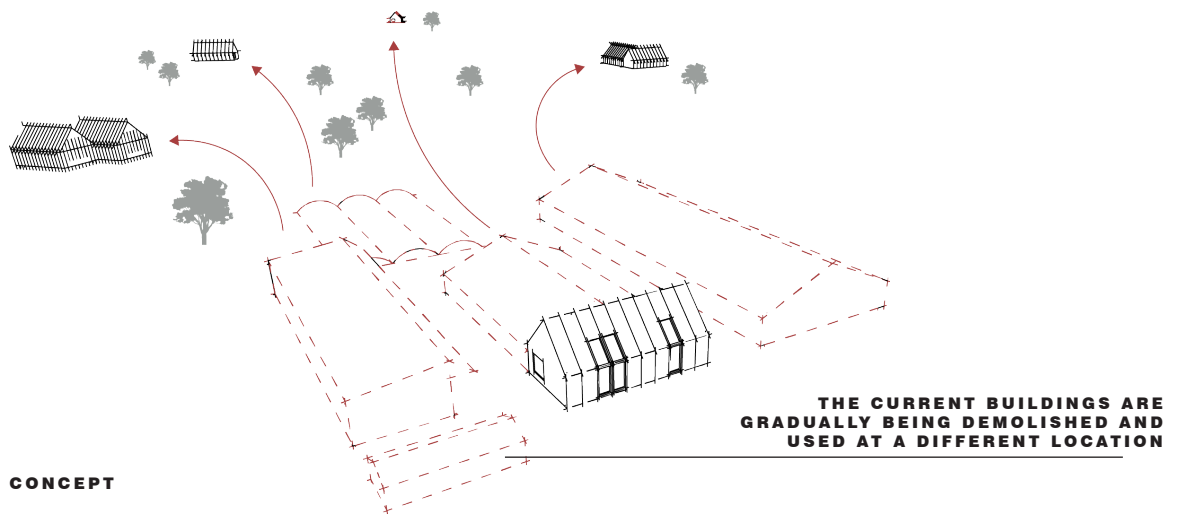
OVERVIEW

DIVIDE

In the third concept, the circular system is emphasized more by converting the large current buildings (depending on the time) into small-scale buildings that seek out a relationship with the natural environment. The natural environment gives space for this because clear lines in the landscape are removed and the forest has the opportunity to change the area.

This process can be interesting for the farmer because it does not have to be a change that must occur at any moment. As soon as the farmer sees the possibility of moving parts of the circular system, he can remove it from the farmyard. This creates more vacant buildings that can be demolished and recycled to place a new structure within the natural environment. It is essentially a circular process in which the materials from the old stables and sheds are used to place new buildings distributed over the natural landscape.

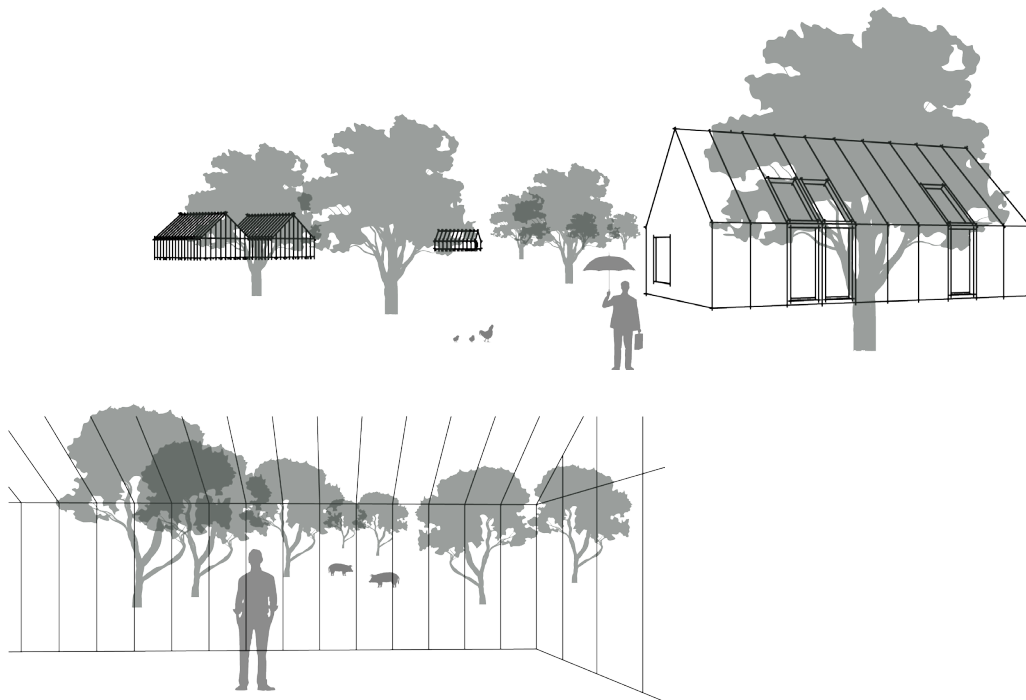
This change provides a completely new approach to agriculture. Agriculture is intertwined with nature and does not necessarily have to be a self-contained circular system. This system can easily be merged with different elements of the other farms in the region. This makes the natural landscape a large wooded village where activities take place in various places.



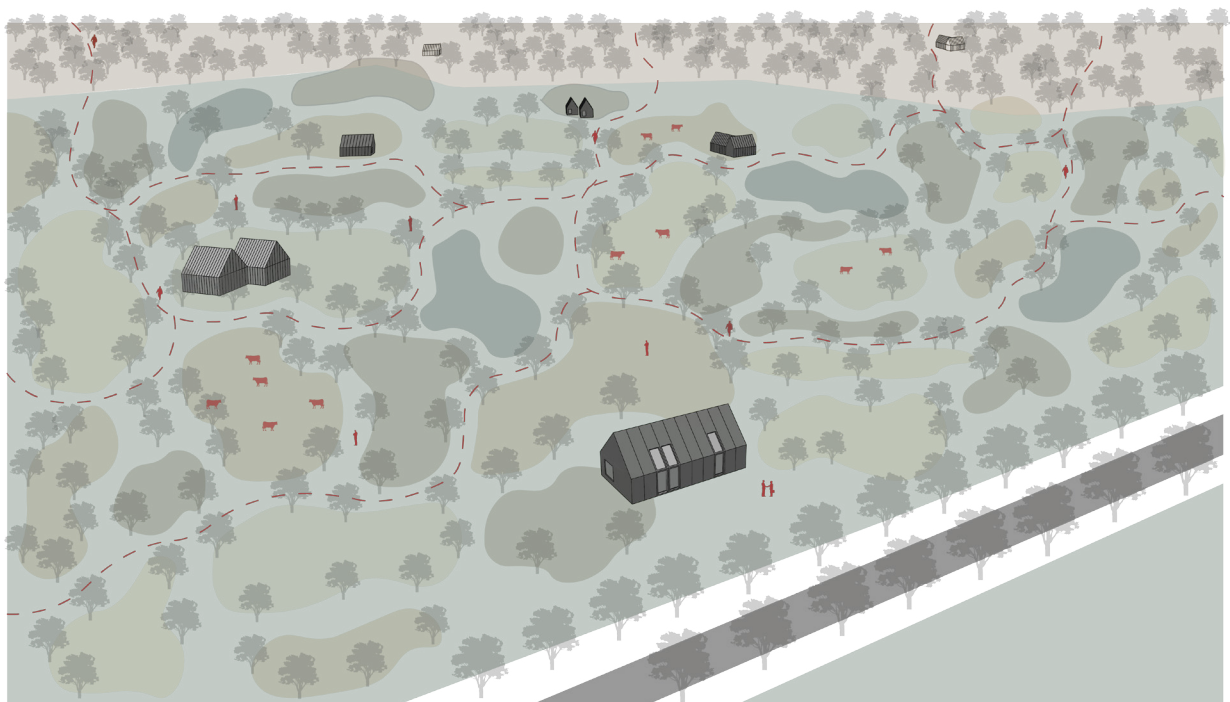
REFERENCEPROJECT:

KEKKILÄ
KARRES + BRANDS
JUNYA ISHIGAMI'S

• VIHervAJA
• OBERBILLWERDER
• ART BIOTOP



IMPRESSIONS



OVERVIEW



MODEL CONCEPTS

● REFLECTION

Based on the 3 concepts, it appeared that there is a lot of potential within the current development of the farm. By retaining the construction, the volume is preserved in the characteristic appearance of the landscape. This can be strengthened with a durable material.

Within the 3 concepts there are always some elements added. In the end I came to the conclusion that I should apply less buildings on the farm to make it more transparent. In this way, more space is created to make sure that visitors can enter the yard.

6. PRELIMINARY DESIGN

Based on the concept phase, it was decided to use the farm of P. Teurlings to transform into a sustainable, circular business where recreation becomes an important part of the system. This is in line with the future sustainability plans that have been set for the area around the Loon and Drunen dunes.

The current farm consists of different buildings. These buildings each date from a different year and offer space for various functions such as the accommodation for the cows, storage, machines and the farmhouse. These buildings are mainly built with brick, wood and steel, with asbestos on some roofs. Furthermore, a clear separation is visible on the site between the living area and the work area at the rear of the plot.

The farm has a random, typical typology but because of its location it offers opportunities to be the connecting to introduce the Brand area with future visitors. In this way it will be a visual gate in which people can enter the nature reserve.

This is reinforced by providing the farm with a **new circular system** in which the farmer has no costs to keep his business running. This circular cycles ensure that all raw materials that are obtained can also be used on the farm. It is a renewed system that forms the basis of an **architectural transformation** that makes it possible for this system to become visible to visitors and also ensures that the current buildings are integrated within the landscape.

P. Teurlings

Dairy farmer & board member ZLTO Brabant

Ulvenhout, North Brabant

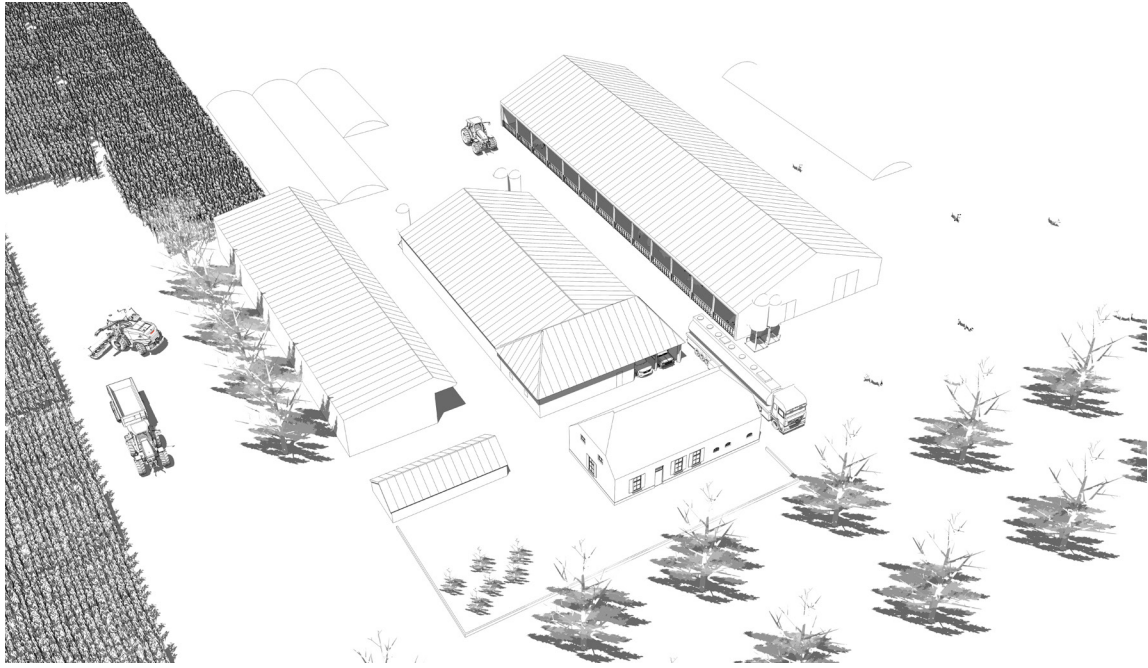
Land: 75 hectares

Dairy cows: 100 pieces

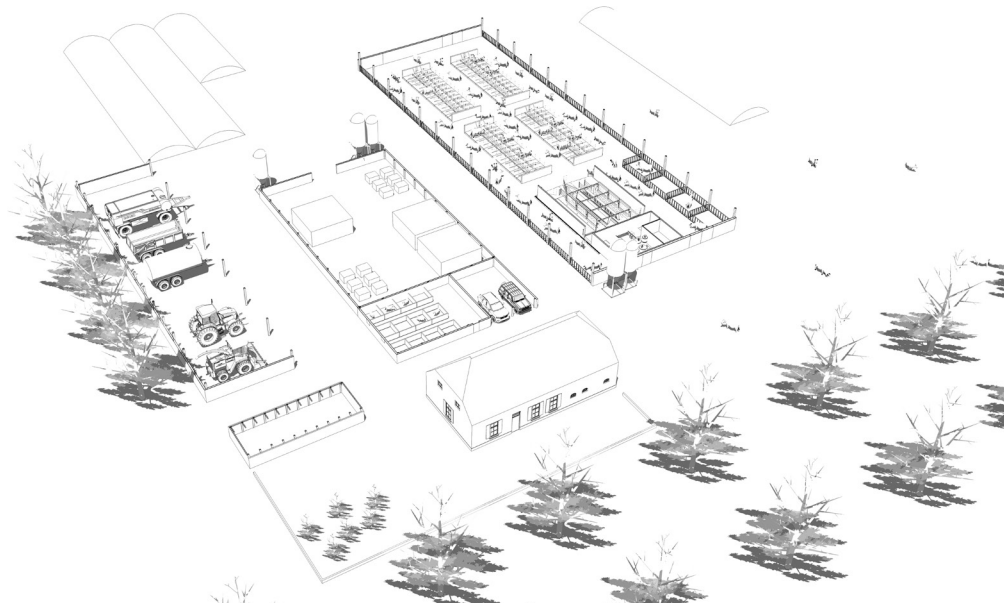
Young stock: 70 pieces (spread over several locations)



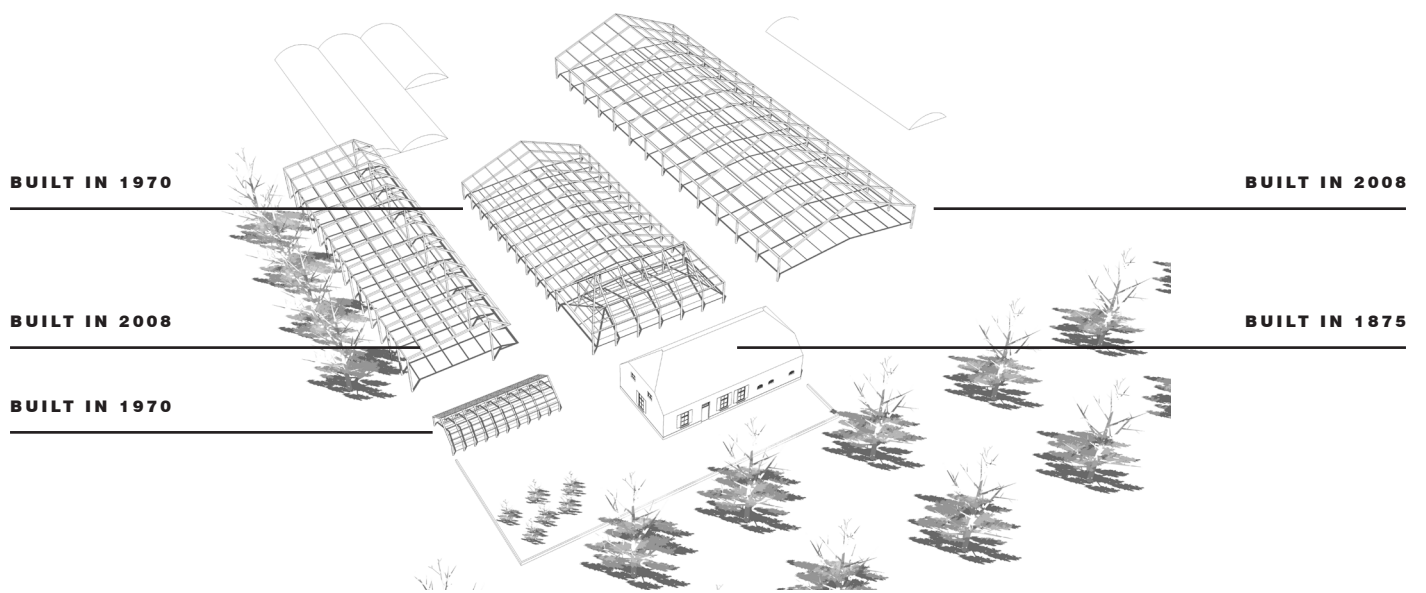
CURRENT SITUATION FARM P. TEURLINGS



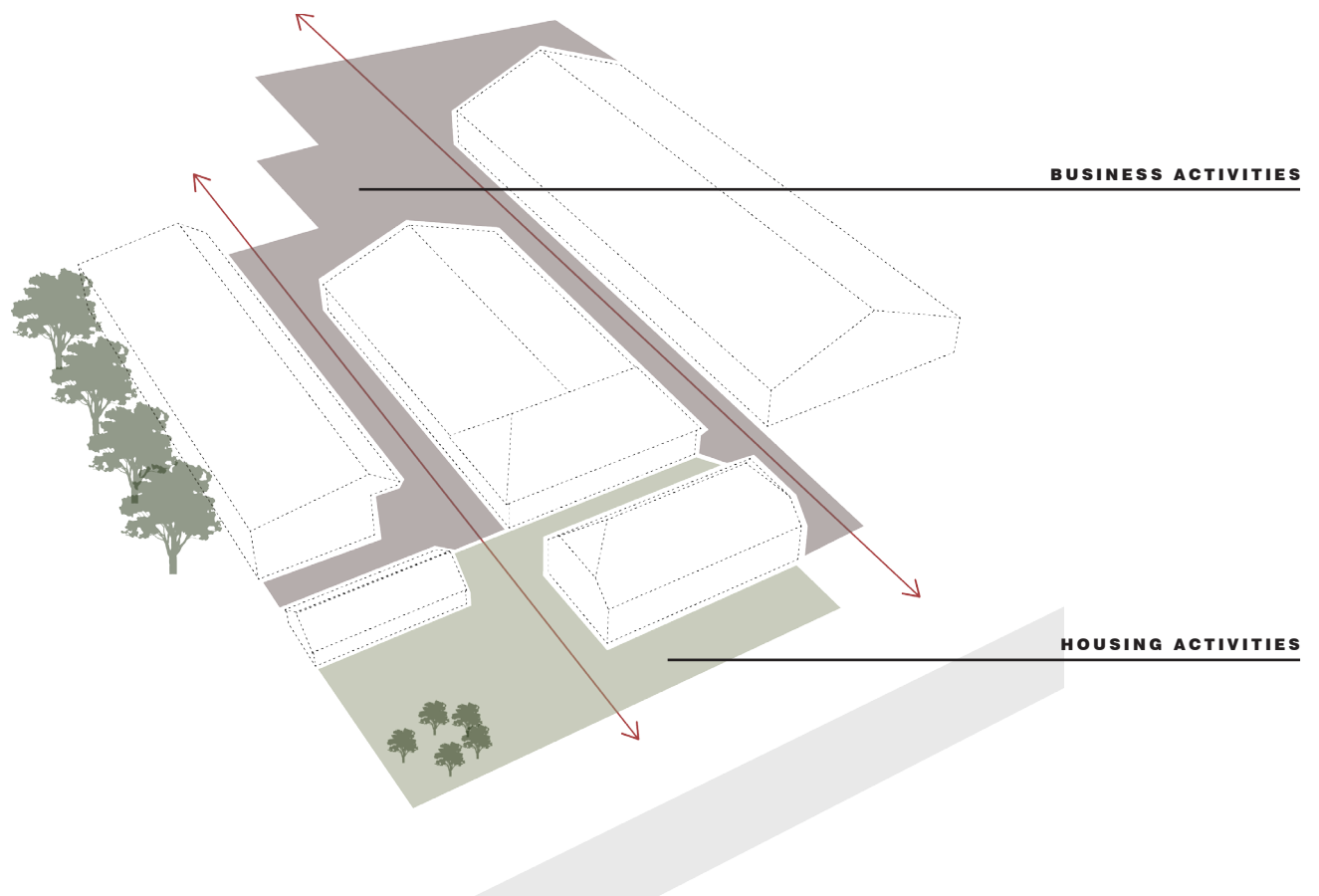
CURRENT FARM P. TEURLINGS



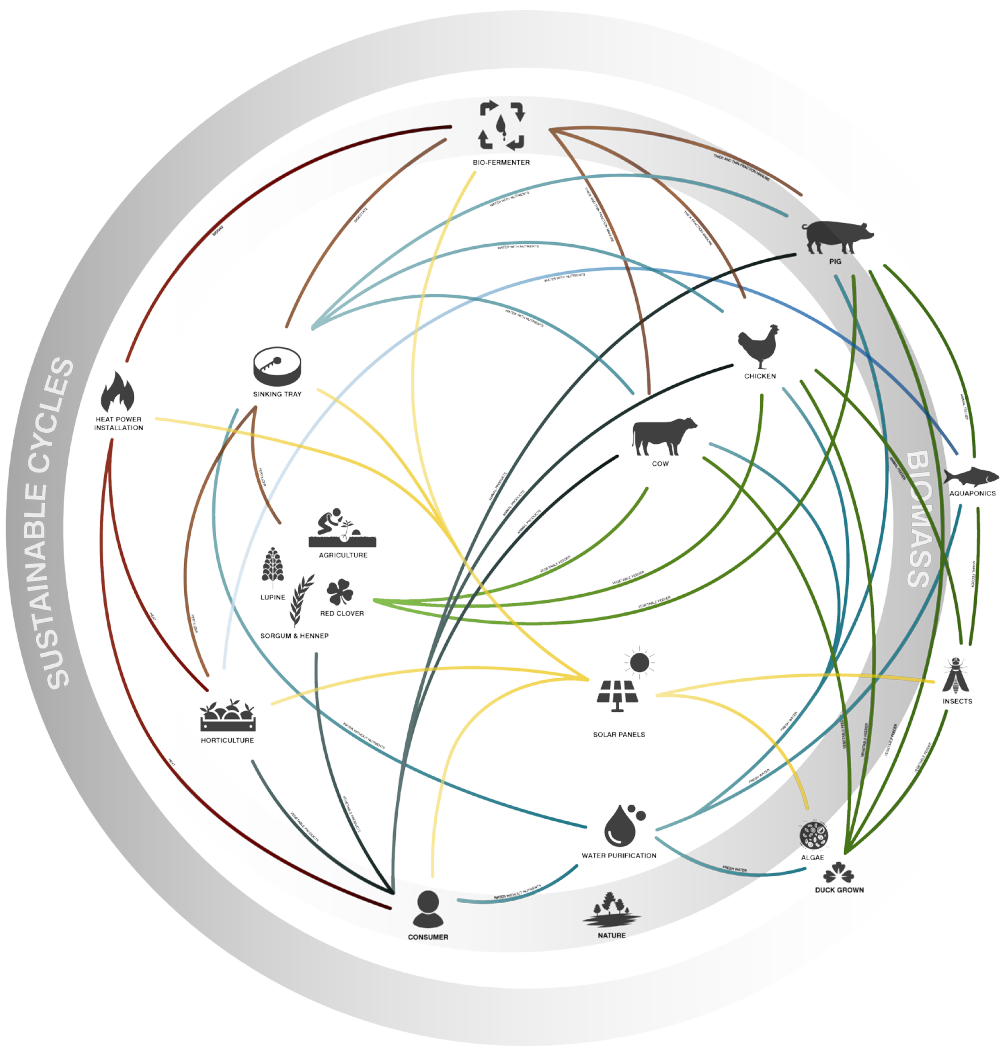
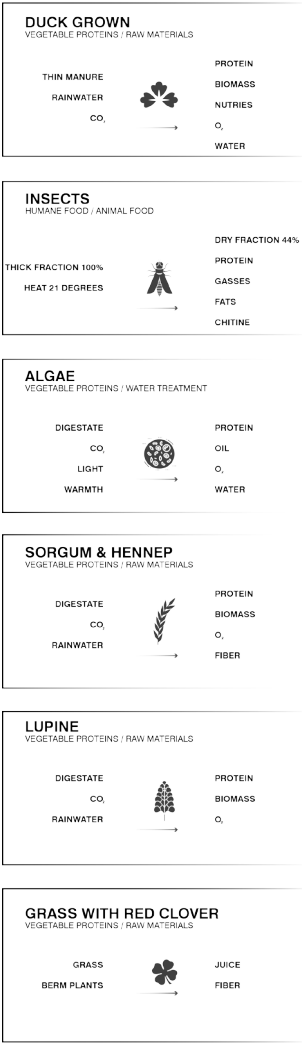
ACTIVITIES



CONSTRUCTION

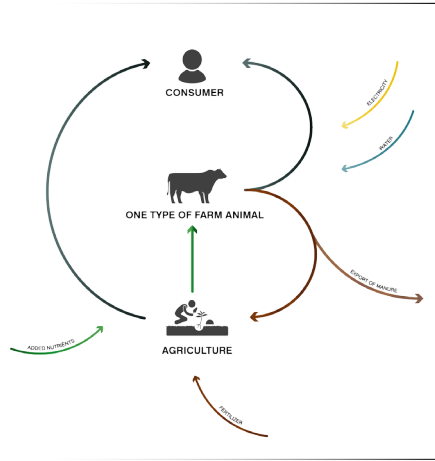


INTERACTION

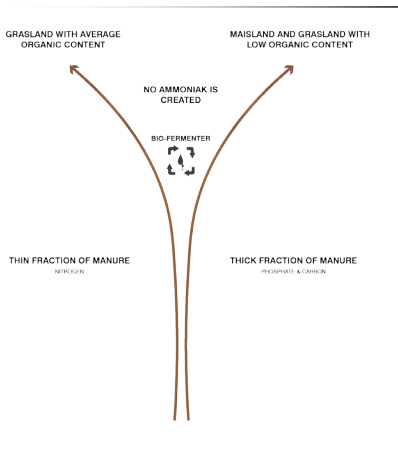


ADDED ELEMENTS

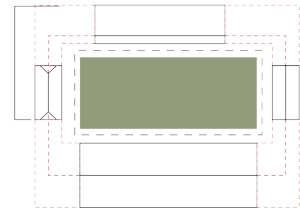
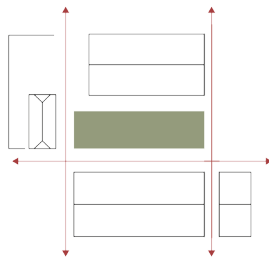
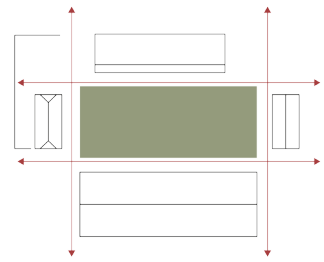
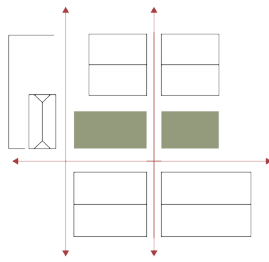
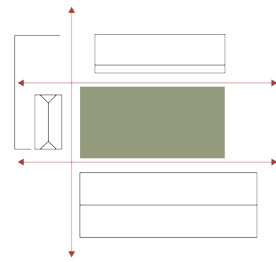
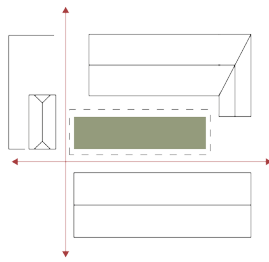
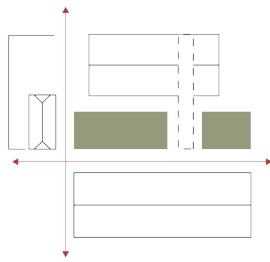
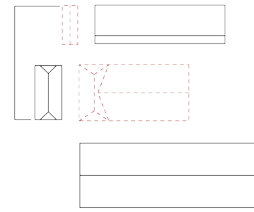
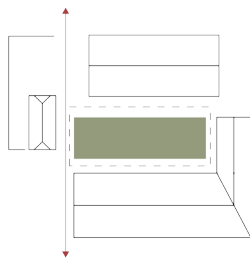
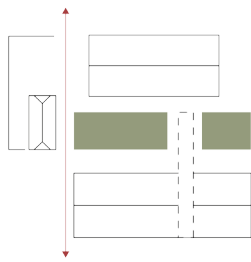
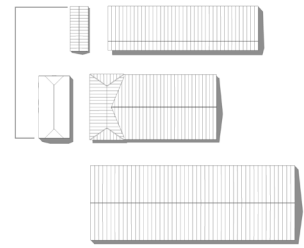
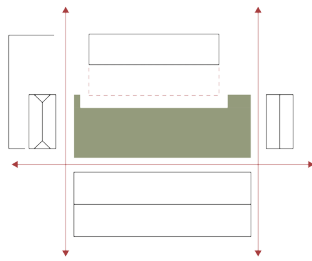
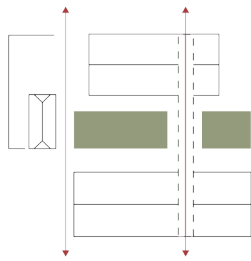
CIRCULAR SYSTEM



CURRENT AGRICULTURAL SYSTEM

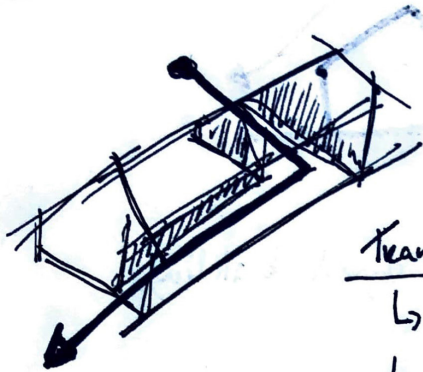


AVOIDANCE OF AMMONIA



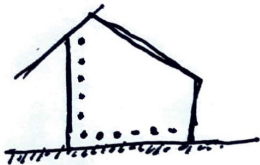
STUDY

Dividing functions in two buildings depending on circular system and Heat resources.



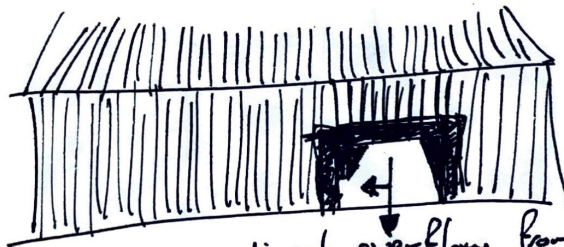
Transparent transformation

- ↳ venting through building
- ↳ semi-transparent facade.
- ↳ rhythm in facade.
- ↳ integrate in landscape.
- ↳ simplicity contrast in material
- ↳ local materials from area.

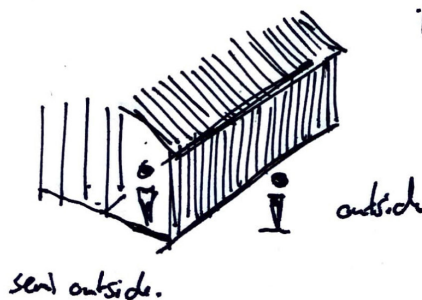


↑
Horticulture
process

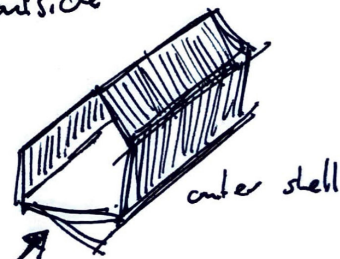
↓
Horizontal/vertical



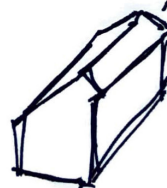
direct overflow from
inside to outside



semi outside.

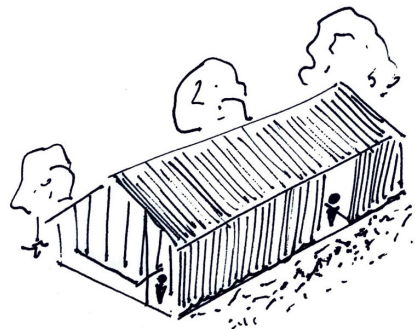
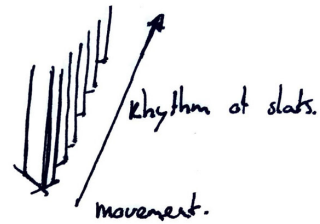
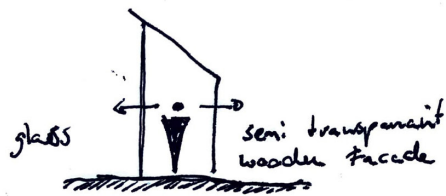
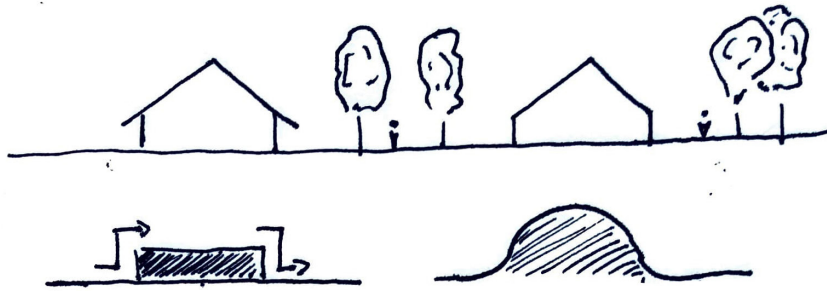


outer shell



inner shell

Differ from landscape Integrate in landscape.



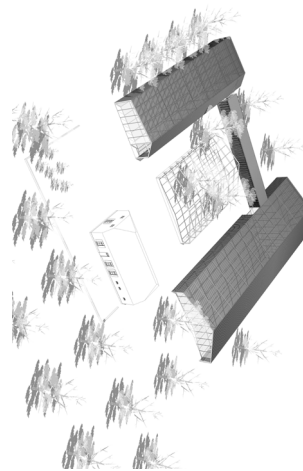
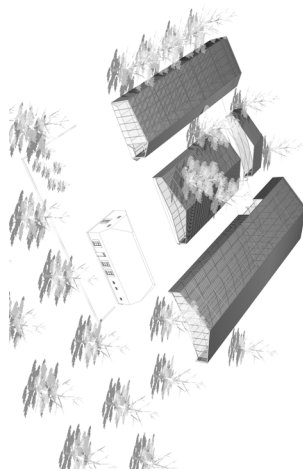
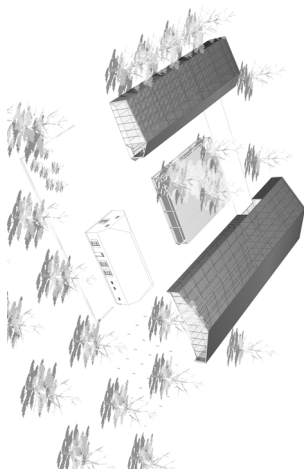
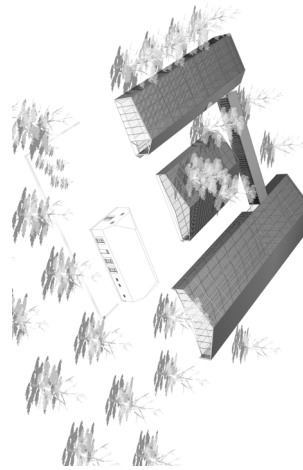
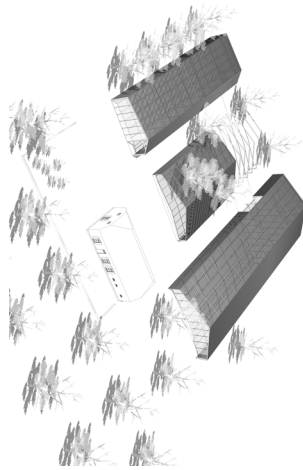
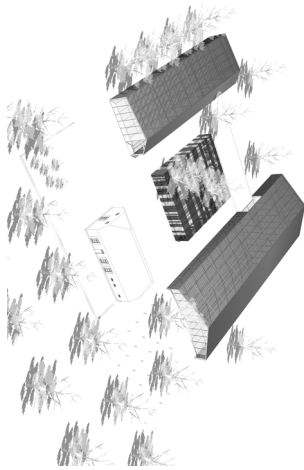
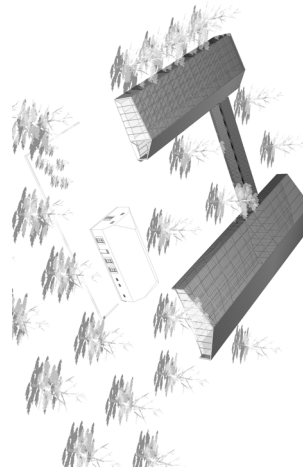
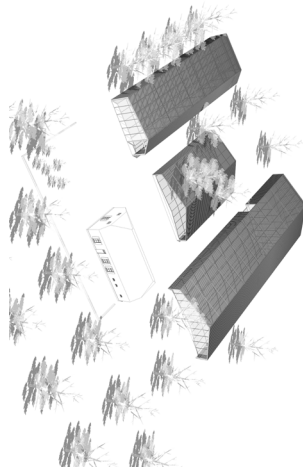
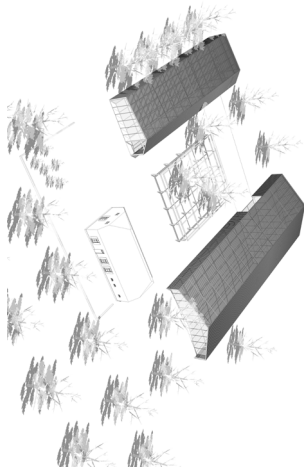
original form is
provided with a new
skin
↳ remain
construction.

- Diversity between closed, open, semi open

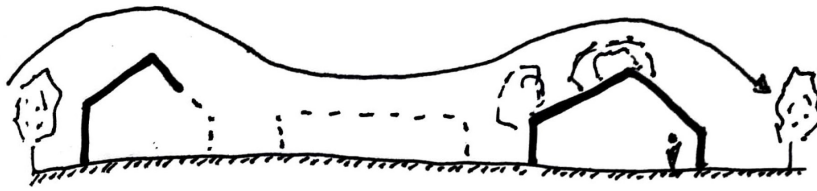
↳ visitors / farmer.

- Routing is the guide wire through the building.

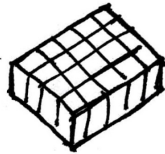
- Adding Accommodation for people to stay and help on the Farm.



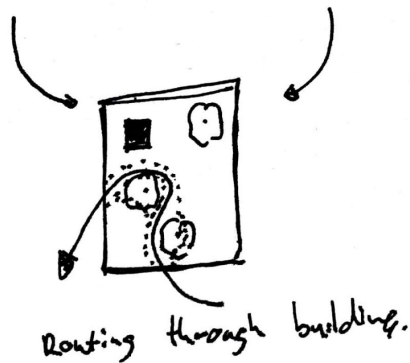
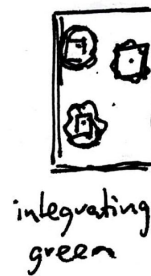
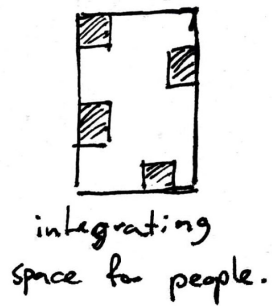
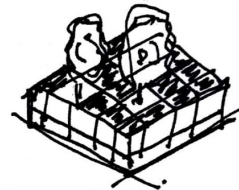
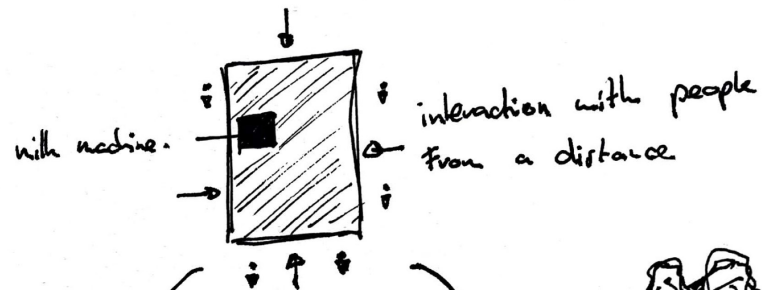
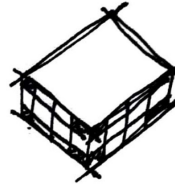
STUDY

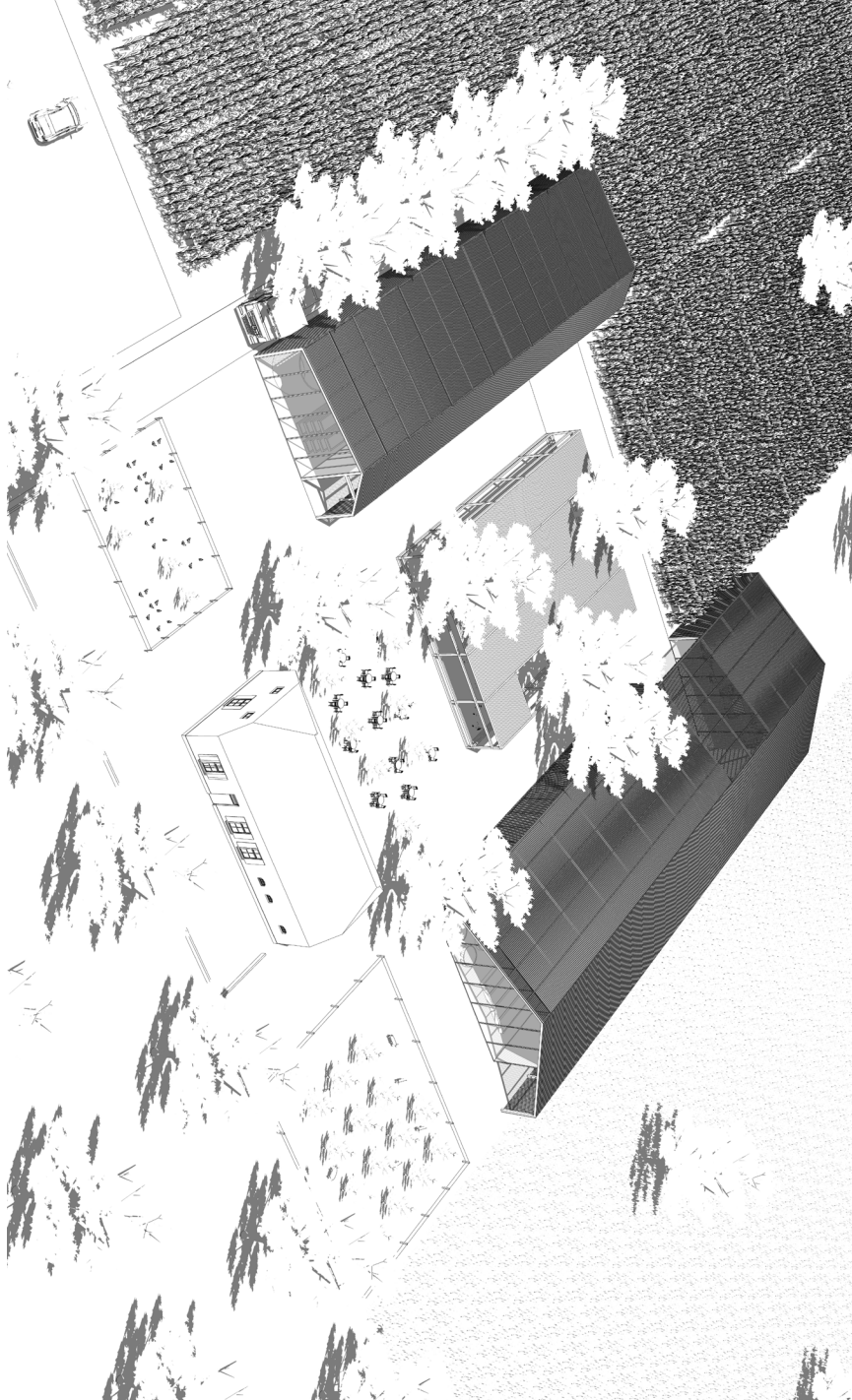


• Inner volume differs from sloped buildings. •

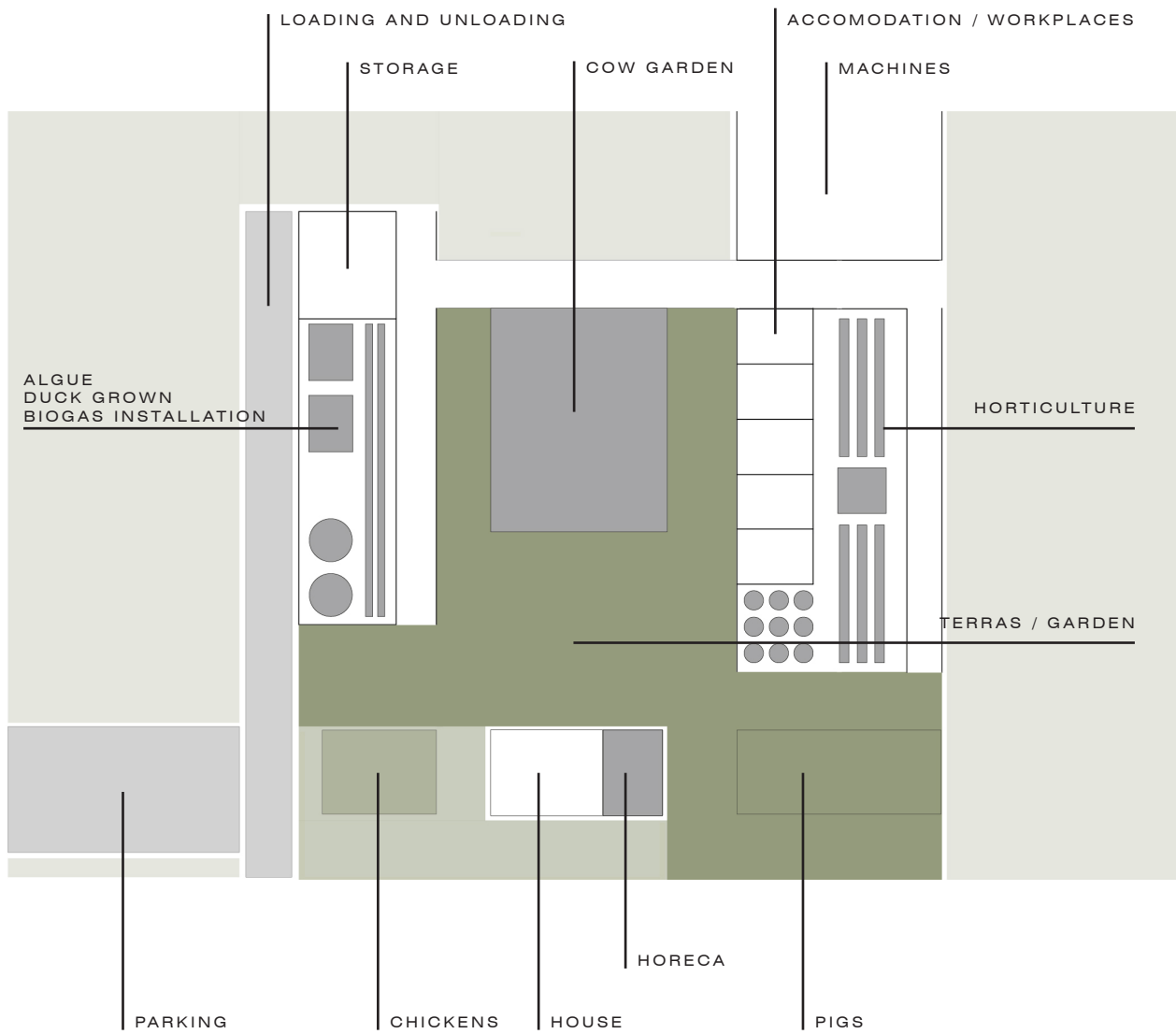


Cow pavilion.

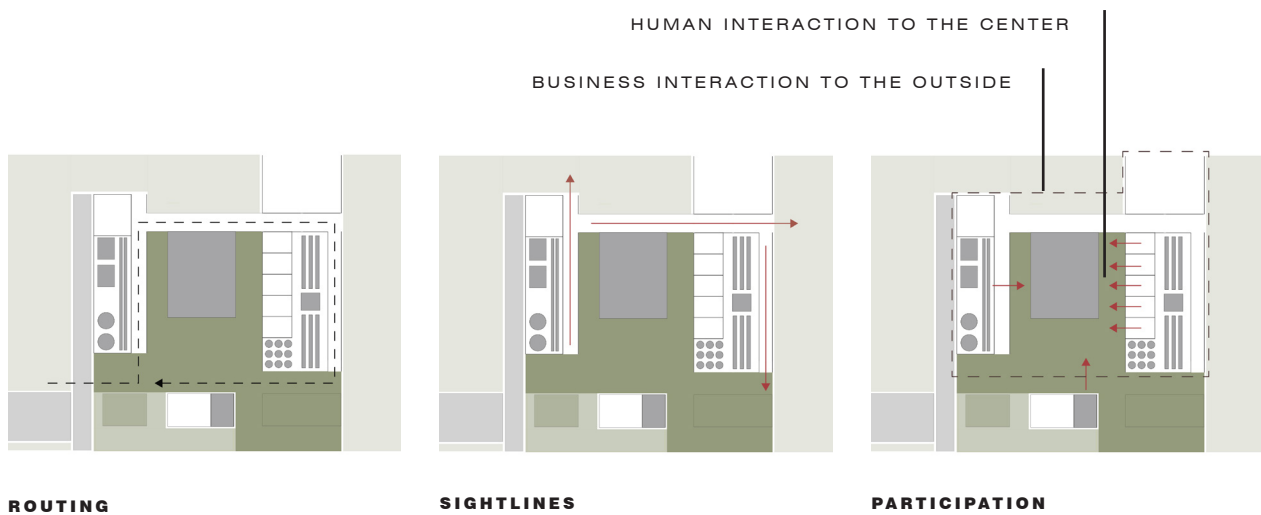


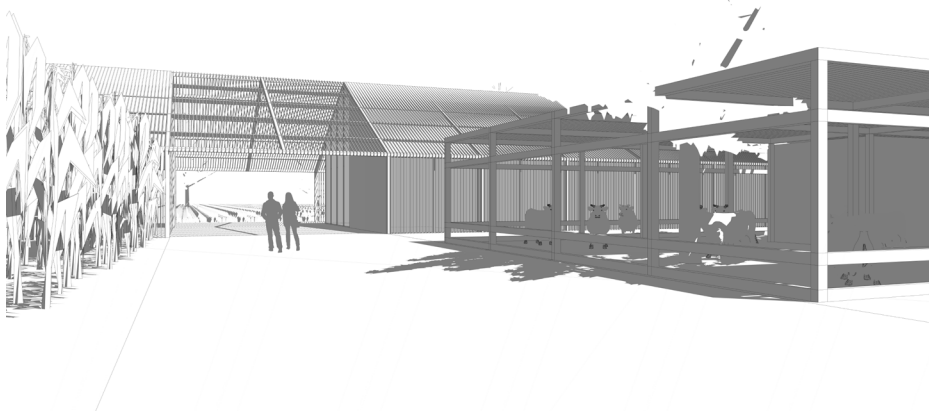
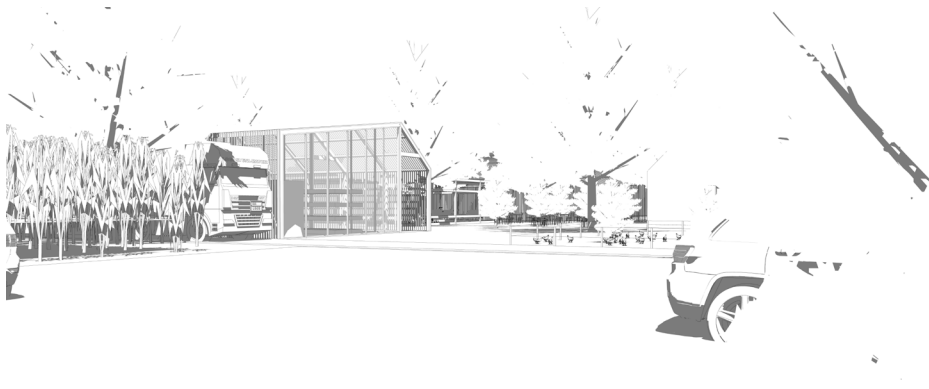


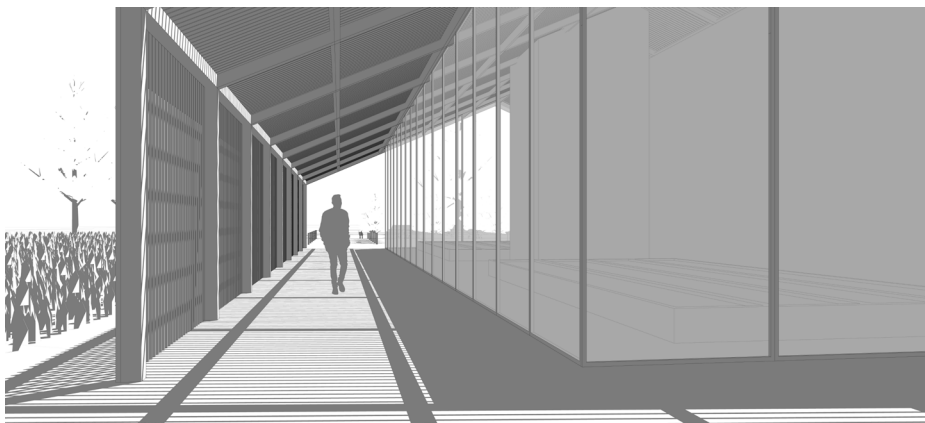
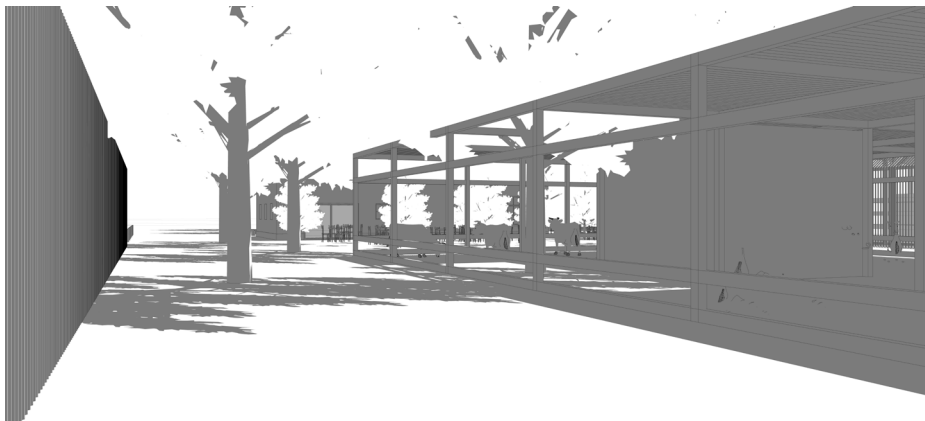
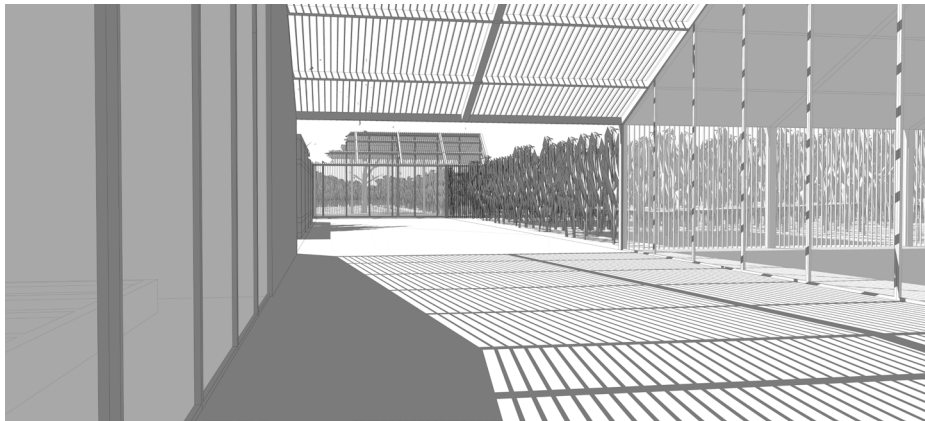
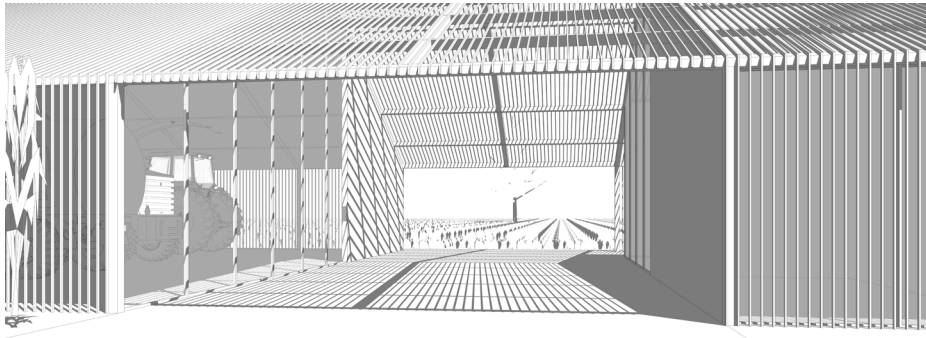
FINAL IMPRESSION

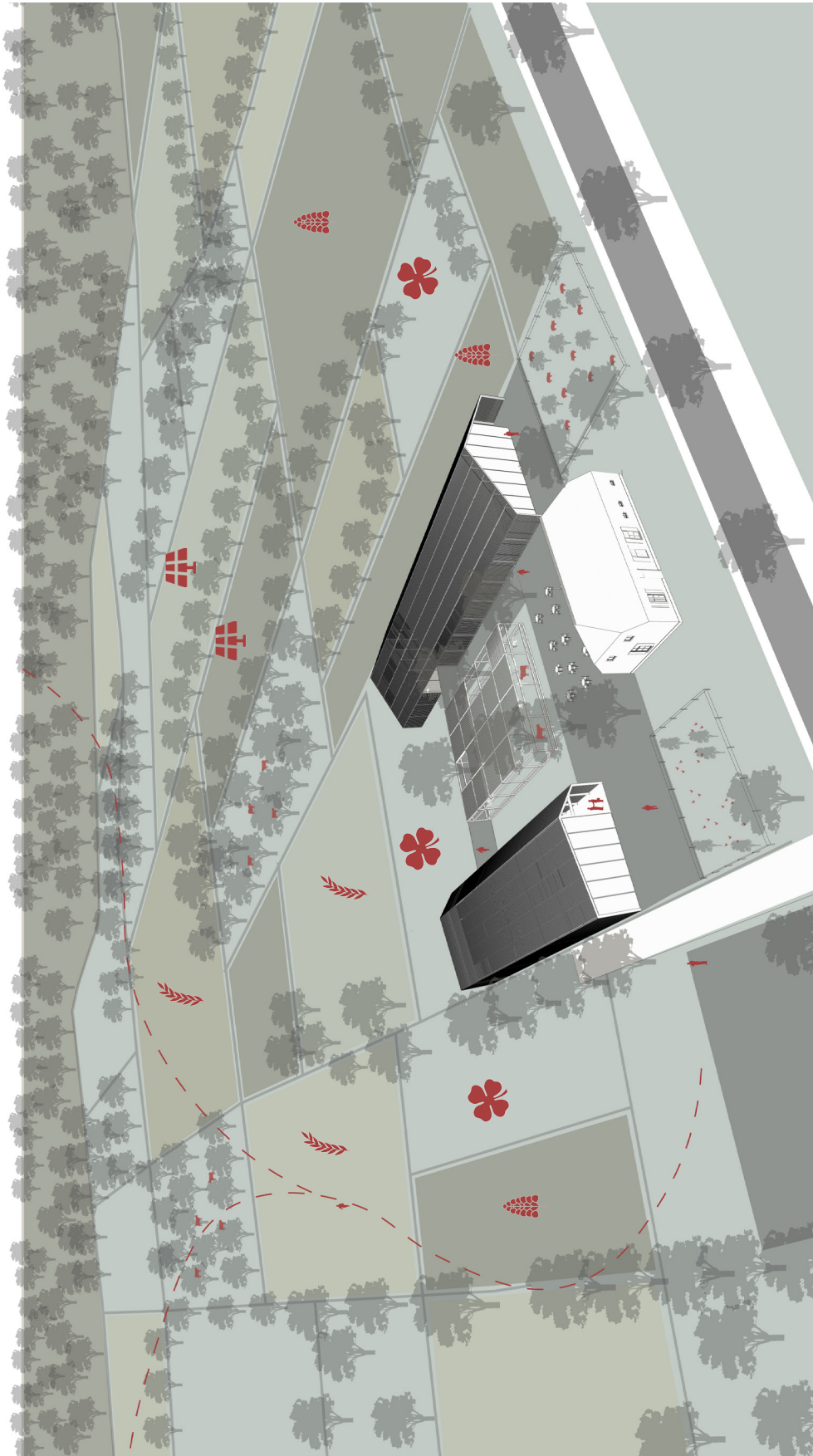


NEW FLOORPLAN









● REFLECTION

After the pre-design phase, it was clear that I had not properly researched a number of points.

Technical aspects:

For example, I did not have insight into how many animals I could keep in the yard in order to obtain enough manure for the biogas installation. It was also not clear how the biogas installation works. This also showed that it was good to demonstrate how the various flows (heat, food production, etc.) within the company are progressing.

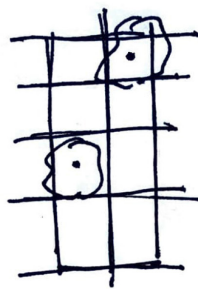
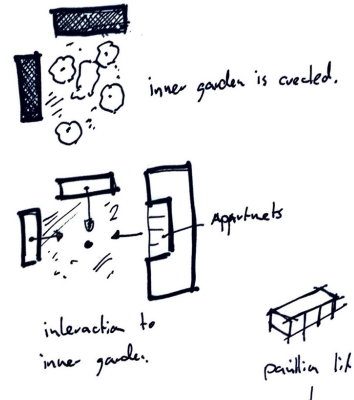
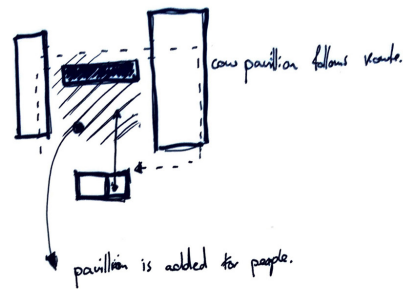
Architecture:

It was clear that the cow garden would become a special icon of the design. The cow garden only served for the accommodation of cows, so the transparent idea of the court disappeared within the central point of the yard. It was also good to investigate the possibilities of creating an inner garden where the visitor, the guest of the accommodation and the animals could jointly become part of this central point. This was also important because visitors couldn't sit dry when ordering from the farm shop.

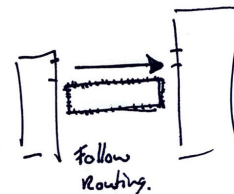
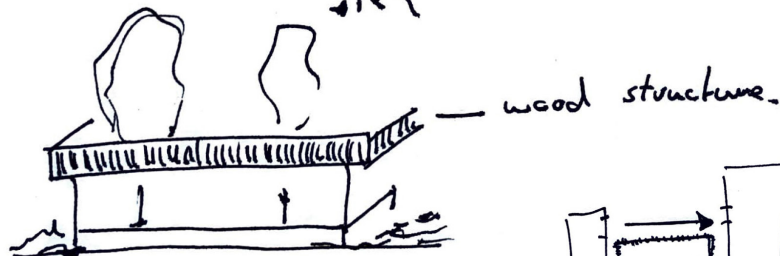
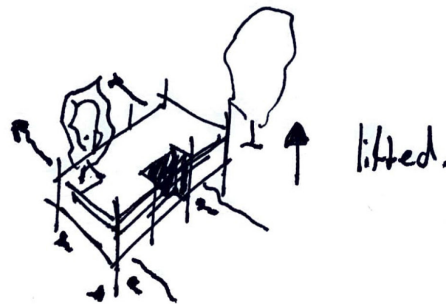
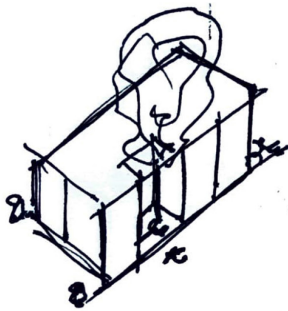
The advice was to start with the scale model in order to gain spatial insight into what the changes would bring to the farm.

7. DEFINITIVE DESIGN

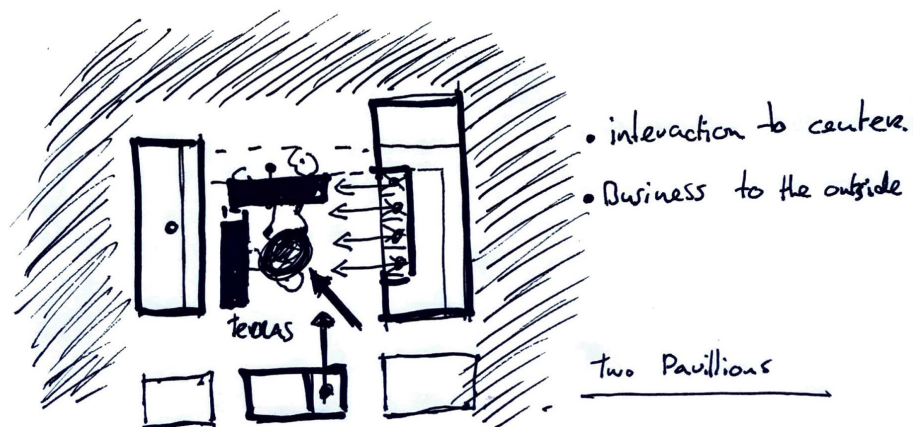
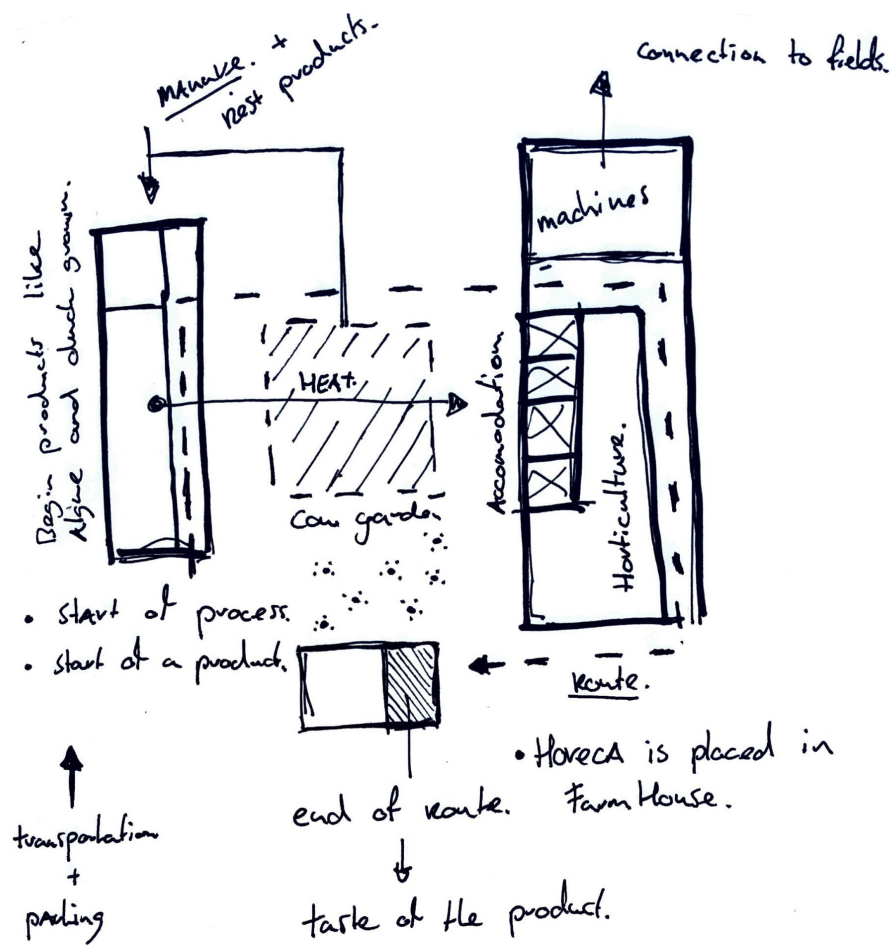
Transparent pavilion → integrate in garden



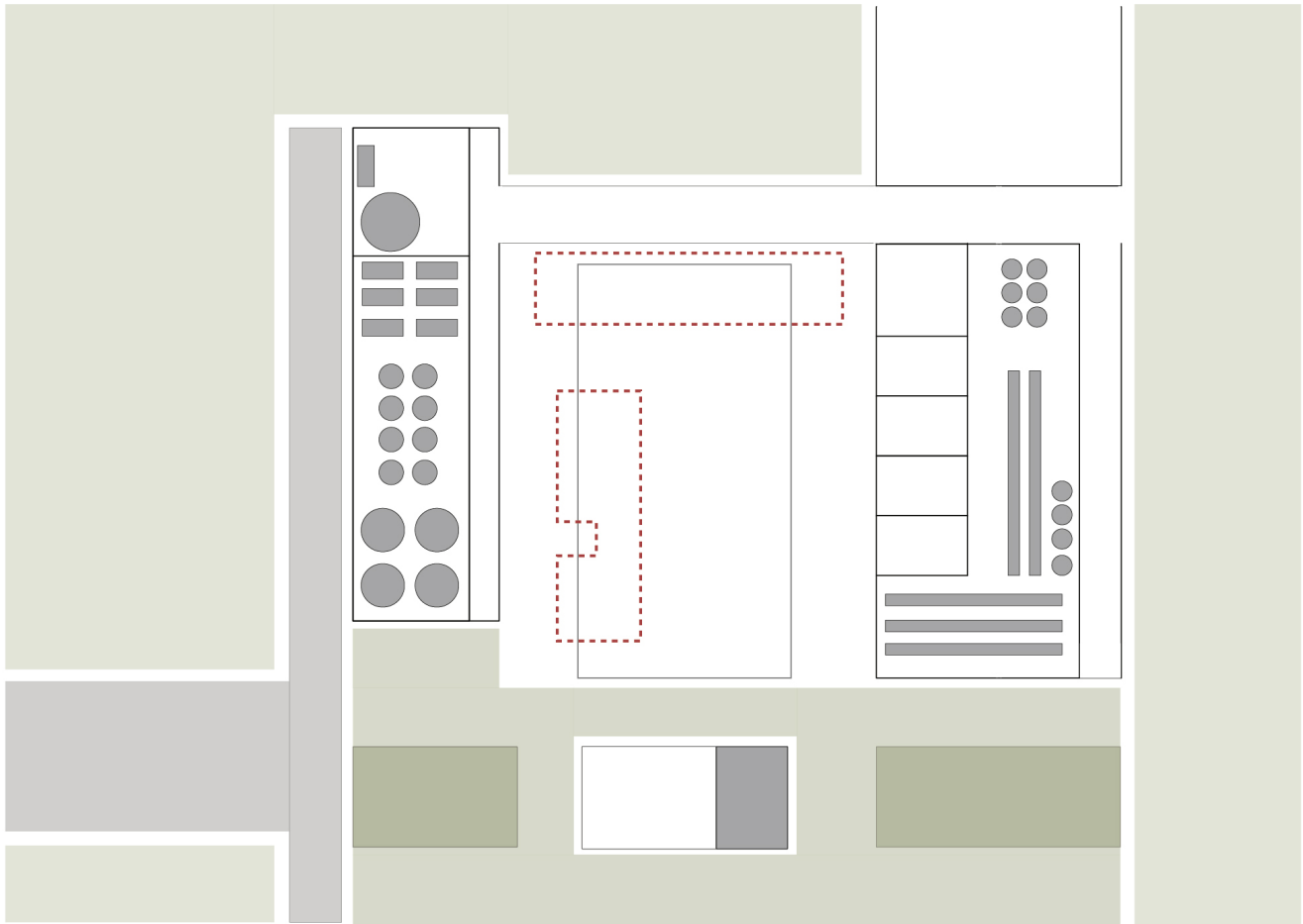
- integrate trees.
- indoor/outdoor zone



SKETCHES RE-DESIGN PRINCIPLES COW/PEOPLE PAVILION



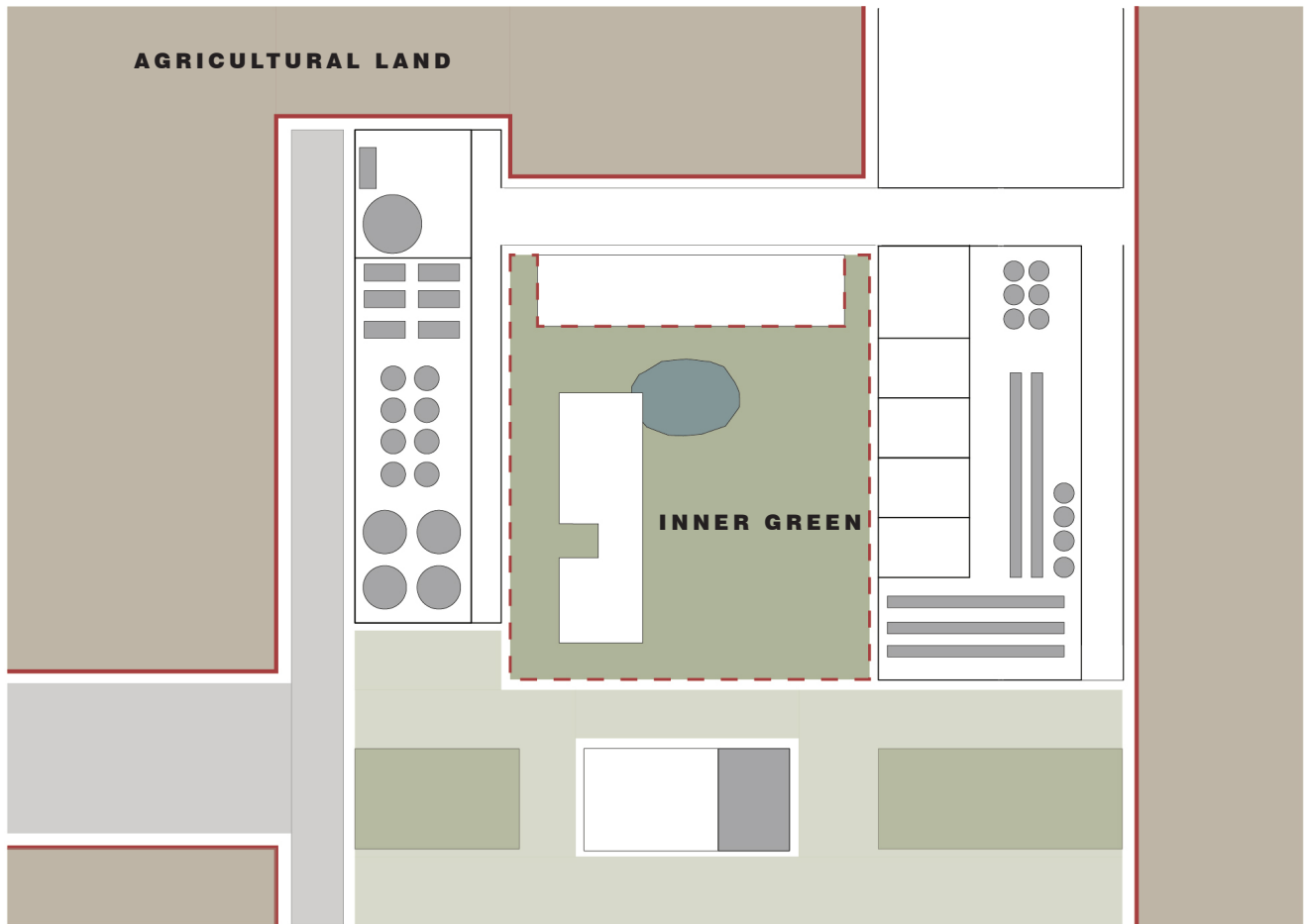
SKETCHES RE-DESIGN PRINCIPLES COW/PEOPLE PAVILION



ADDING NEW VOLUMES

Based on studies, it was decided to make the farm more transparent. To do this, it is important to look at spatiality and the state of the current buildings. The middle barn will be demolished to create more **spaciousness** on the plot. These materials will be **re-used** for the construction of two new volumes. This volumes are lower and deviates from the traditional sloping roofs by creating a more court structure. One of the new volumes will accommodate the cows and will also serve as a connecting element between the two large stables. The other volume is a raised, multi-functional pavilion that offers space to have drink, education purposes, etc. Raising and minimalizing the pavilion makes it more part of the new courtyard.

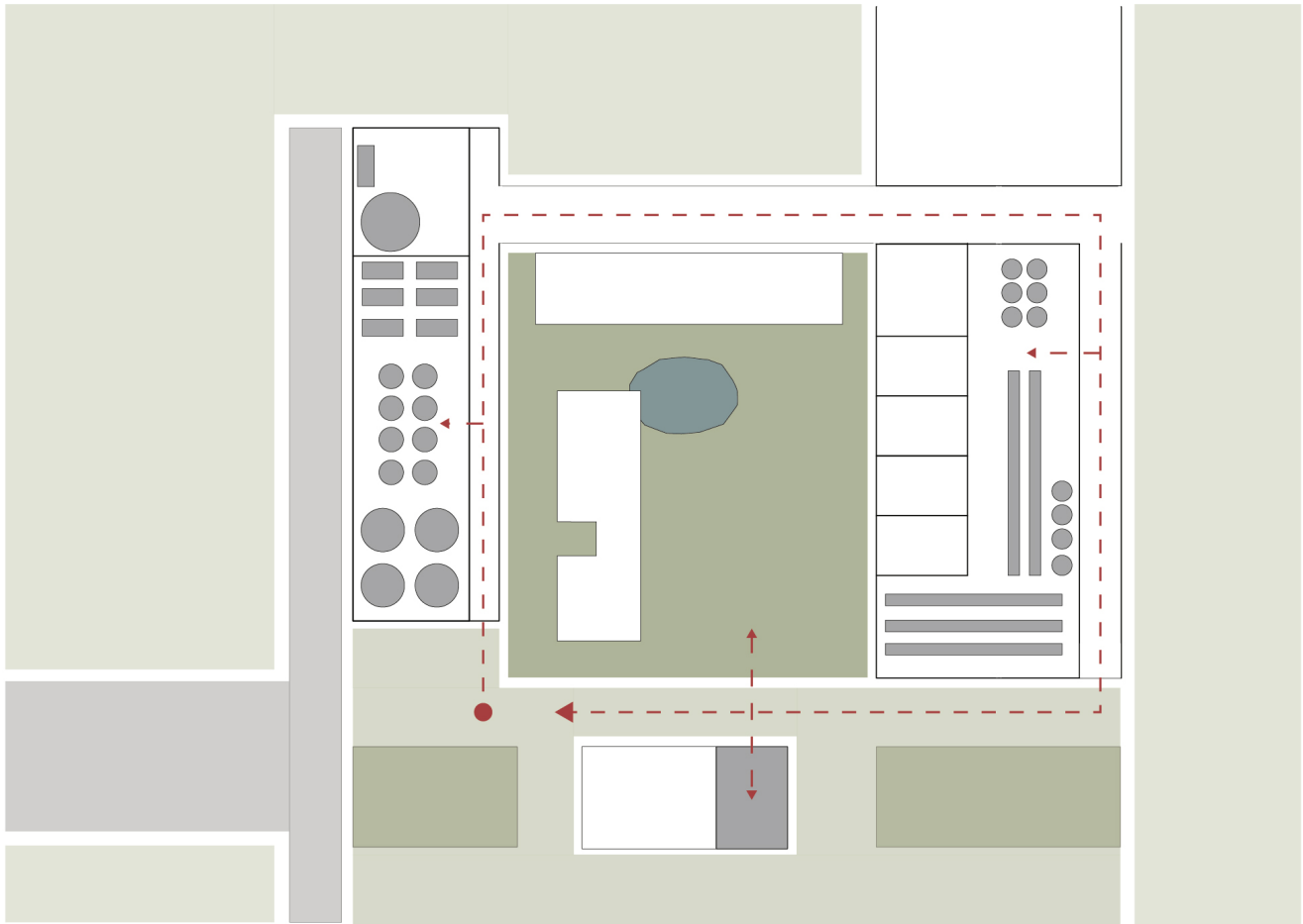
The traditional logging forms of the other buildings will continue to exist and will even be reinforced (at the current barn for the machines) by partially extending the logging form.



ZONING

By partially removing the activity from the heart of the farm, a green zone is created. As a result, all business activities can be found at the edges of the farm, creating a courtyard.

Wood is used primarily for this transformation. The area the Brand characterized over the years mainly because of the wood extraction. The area consisted mainly of alder trees, but this was replaced by oak trees around 1950 due to the increasing demand for building materials. To strengthen the **connection** to the nature reserve, it has been decided to bring this alder wood back within the new concept. This can be seen in both the new façade and the planting of the inner green space.

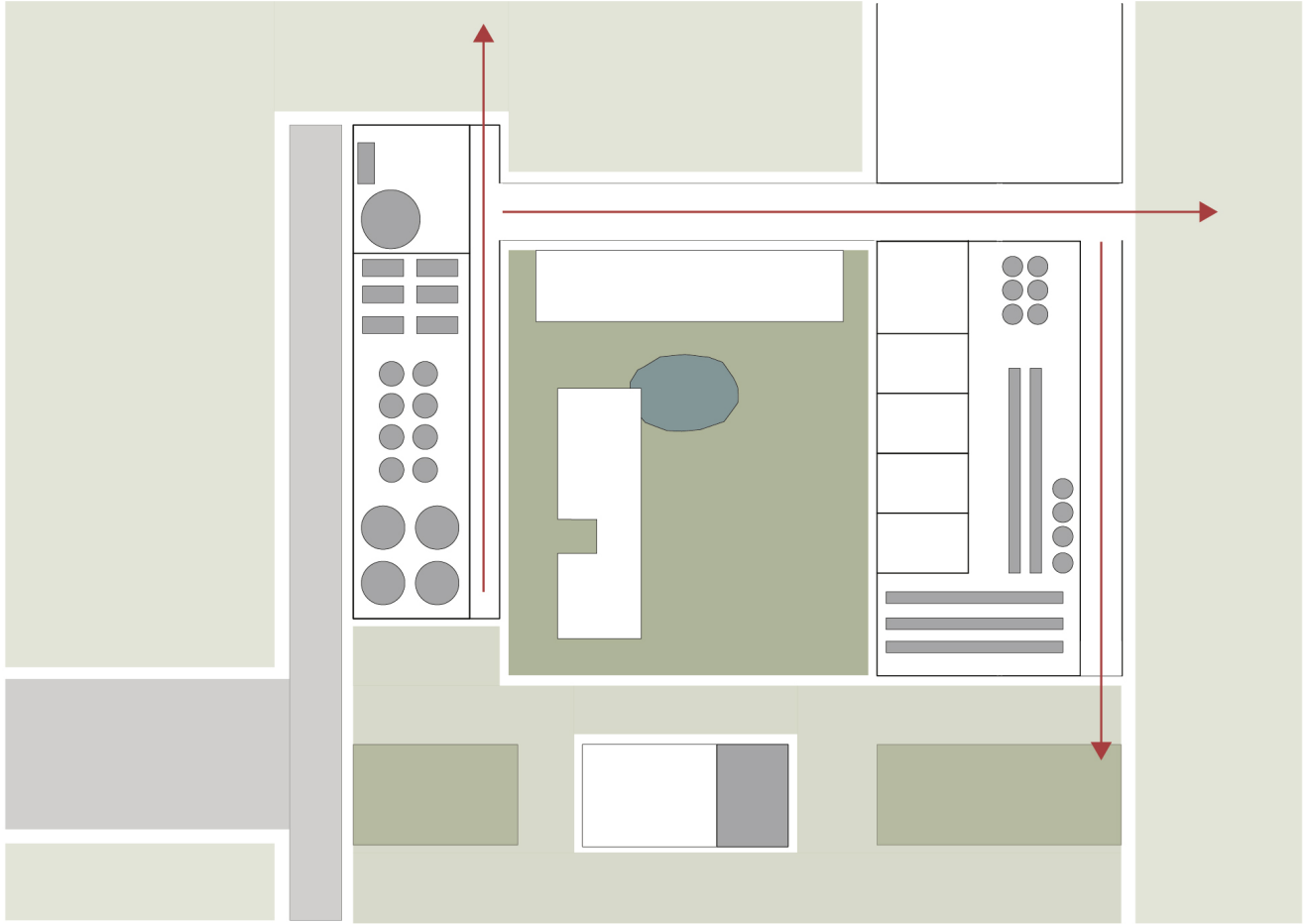


ROUTING

The **routing** to go through the terrain is essential to experience the circular system. As a result, the route starts with the first elements within the cycles such as the growth of algae and duck grown. These phases are visible within the new buildings and are closed with clear **sightlines** towards the fields. This allows you to experience the small-scale and large-scale components that are needed to complete these cycles.

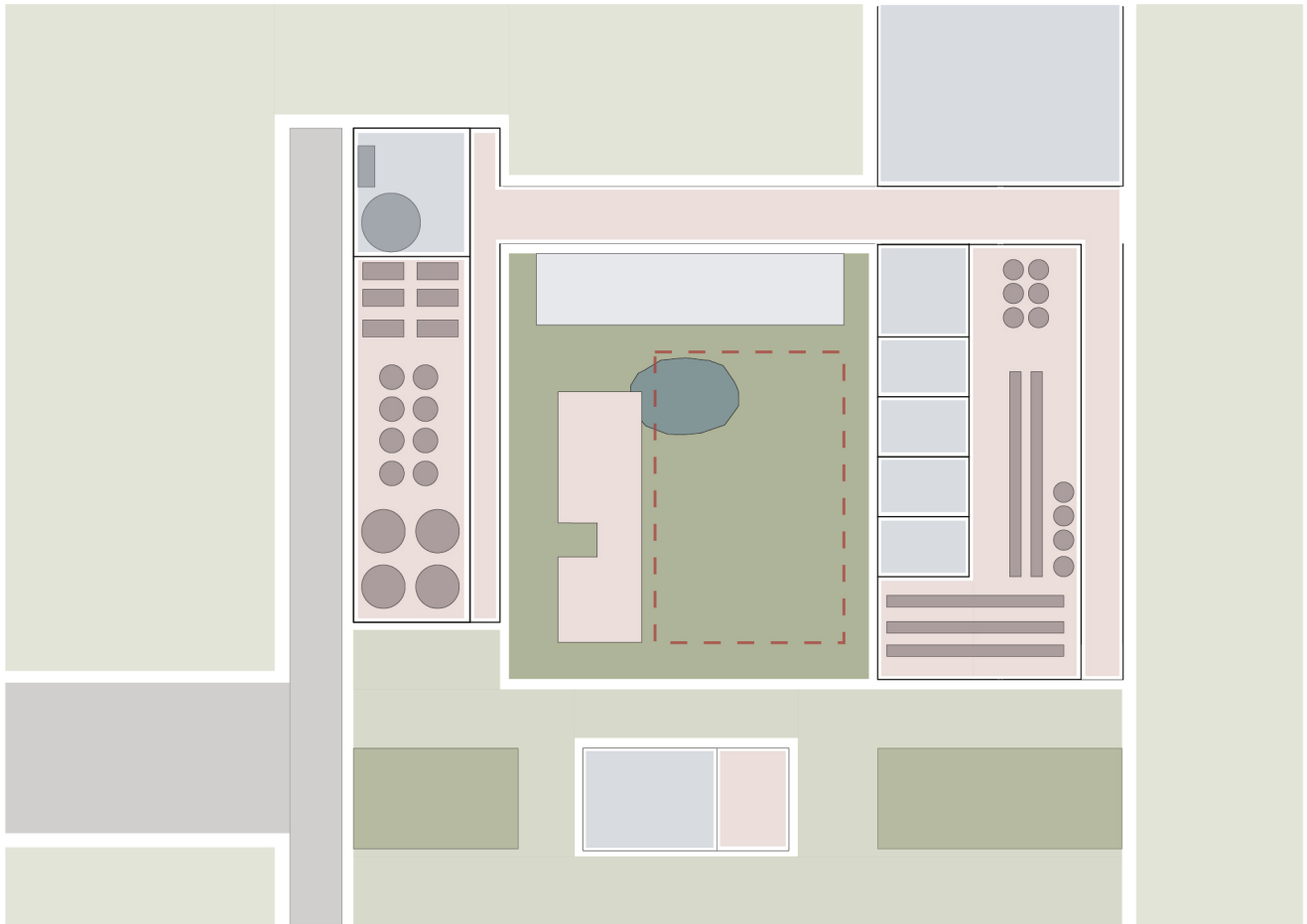
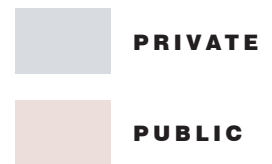
Because these fields change crops every year, the experience will be different at every moment you will visit the farm. The route leads to the green courtyard where you can become part of this circular system by tasting some local products from the shop that is placed in the room where the cows used to be live.

The routing shows that this farm becomes a **social** and **educational** experience in which the visitor can contribute.



SIGHTLINES

The sightlines automatically guide you through the process, which is also reinforced by the variance of open and semi-closed facades.



PARTICIPATION

Because several new production processes are being added to the system, more people will be needed to implement them. Where modern farms choose to keep employees or visitors away from the company as much as possible, this system requires that they are literally **integrated** into the updated plan.

It is possible for the visitor to literally move through the production process. This allows you to experience the renewed system up close. The accommodations for overnight stays are located at the courtyard. These accommodations will hardly be inhabited during the day as the people will help on the farm. As a result, the accommodations are quite hidden by the wooden slatted facade for privacy, but it does give guests the opportunity to enjoy the green courtyard in the evenings.

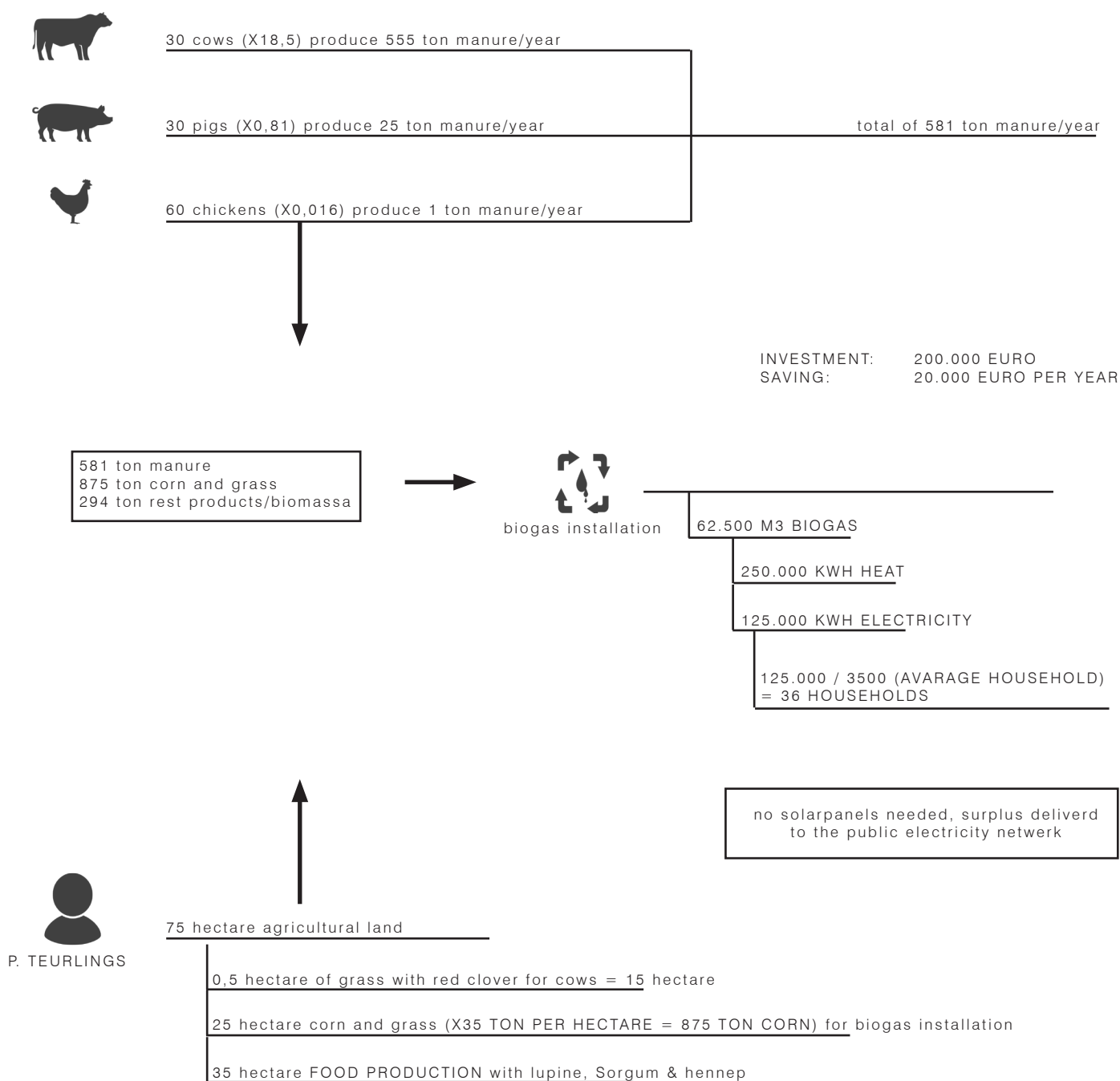
It was decided not to transform the traditional farmhouse so that it differs from the street. The main road that is located next to the farm is characterized by traditional longitudinal façade farms that is parallel to the street. By allowing the farmhouse to become part of the circular system, the space where the cows used to be held in the past will be converted into a shop with products produced at the farm. It is possible for the visitor to buy something here and then consume it in the courtyard.

SUSTAINABLE AGRICULTURE

"It does not matter how many cows a farmer has, since the amount of milk per worker determines what is left under the line"

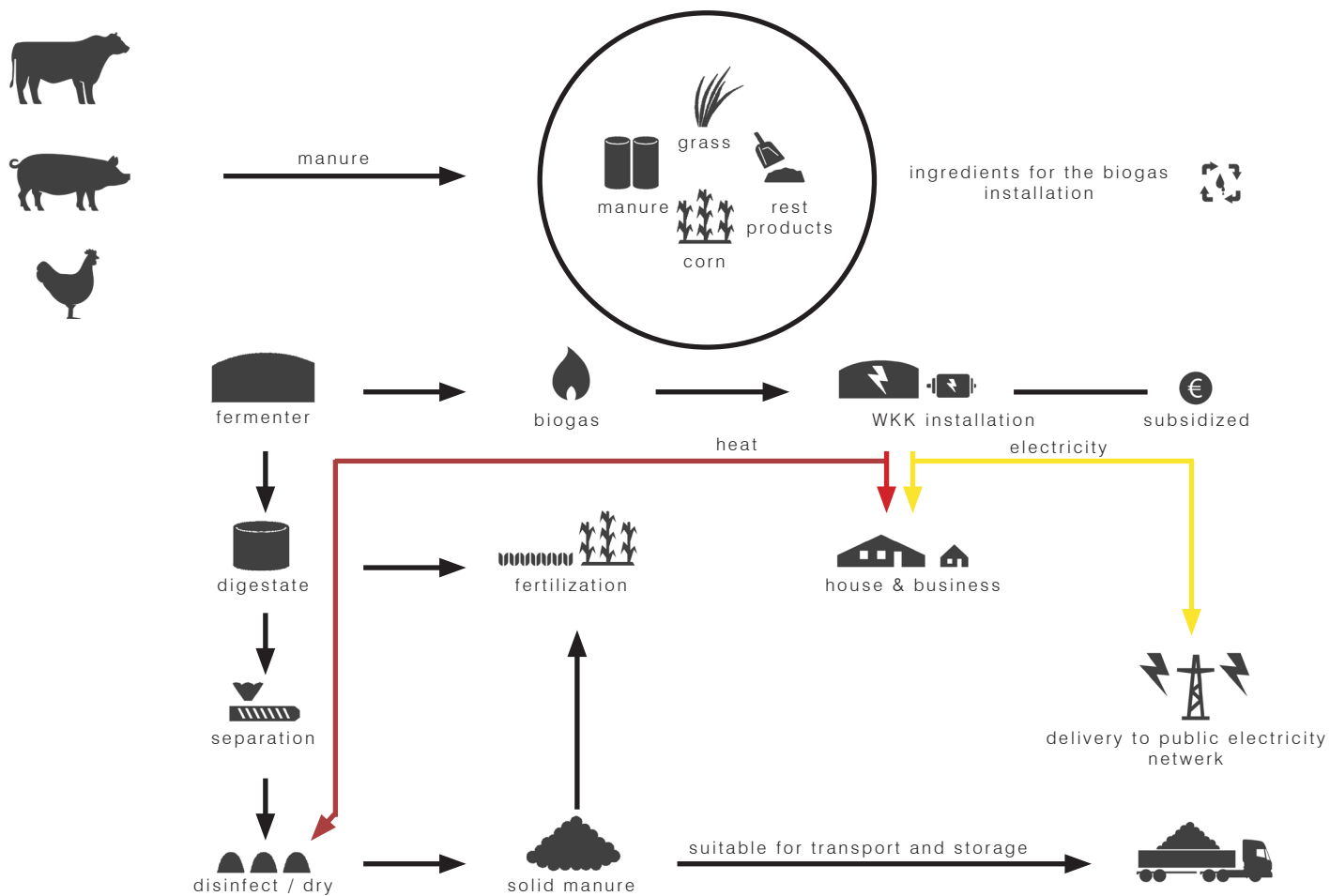
P. TEURLINGS

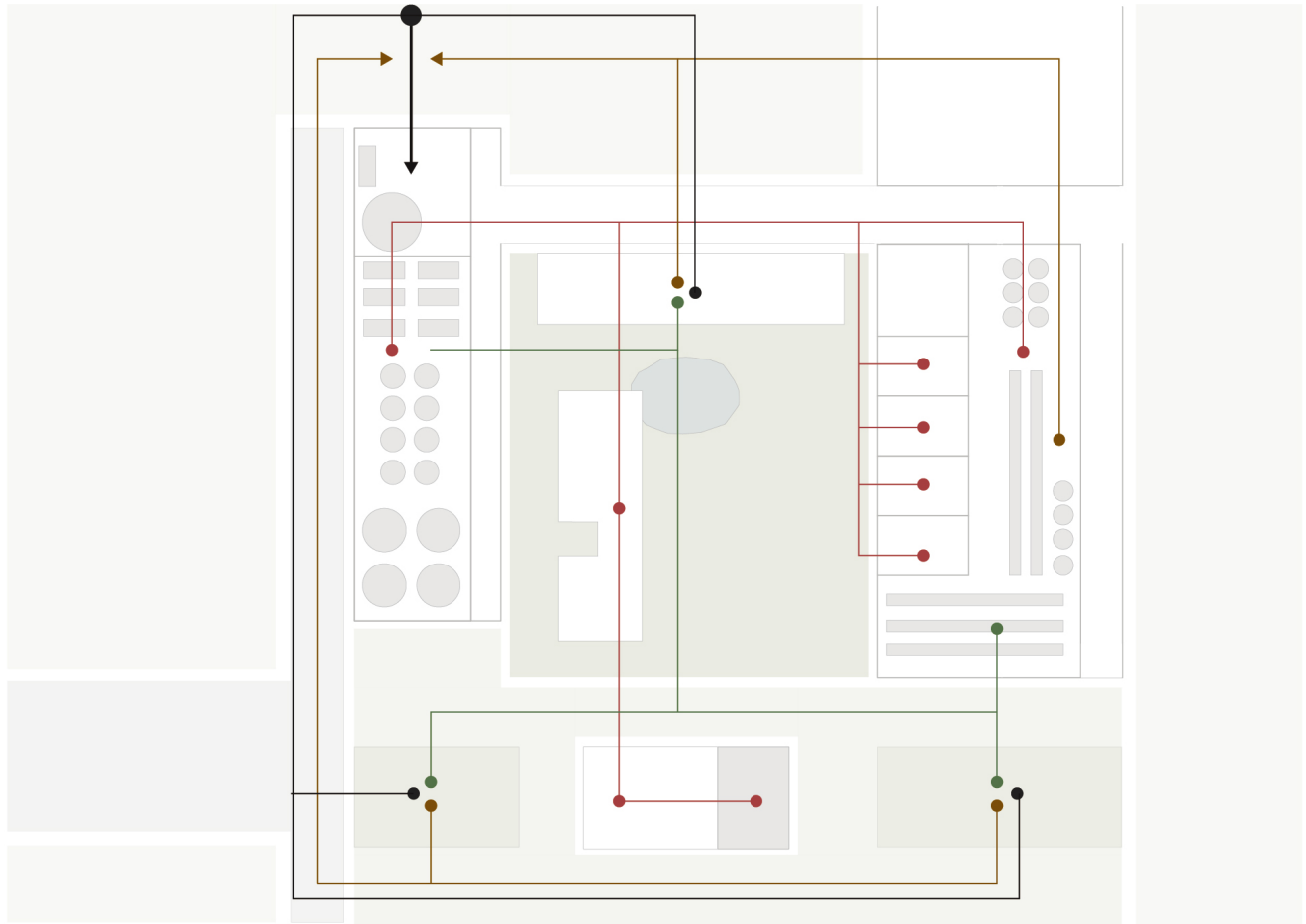
By increasing the range of products and involving participants in the production process, it is possible for the farmer to establish a profitable, sustainable business system.



SUSTAINABLE AGRICULTURE

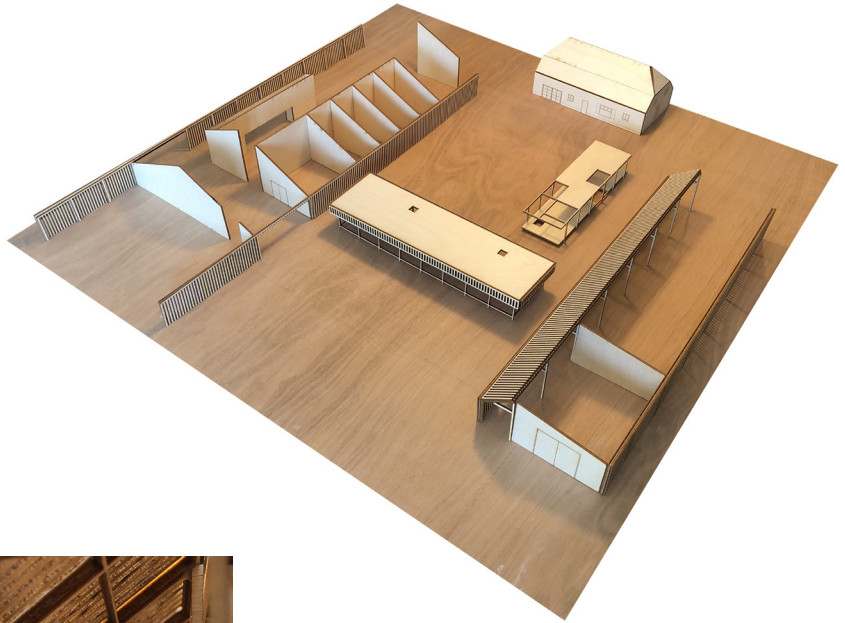
biogas installation



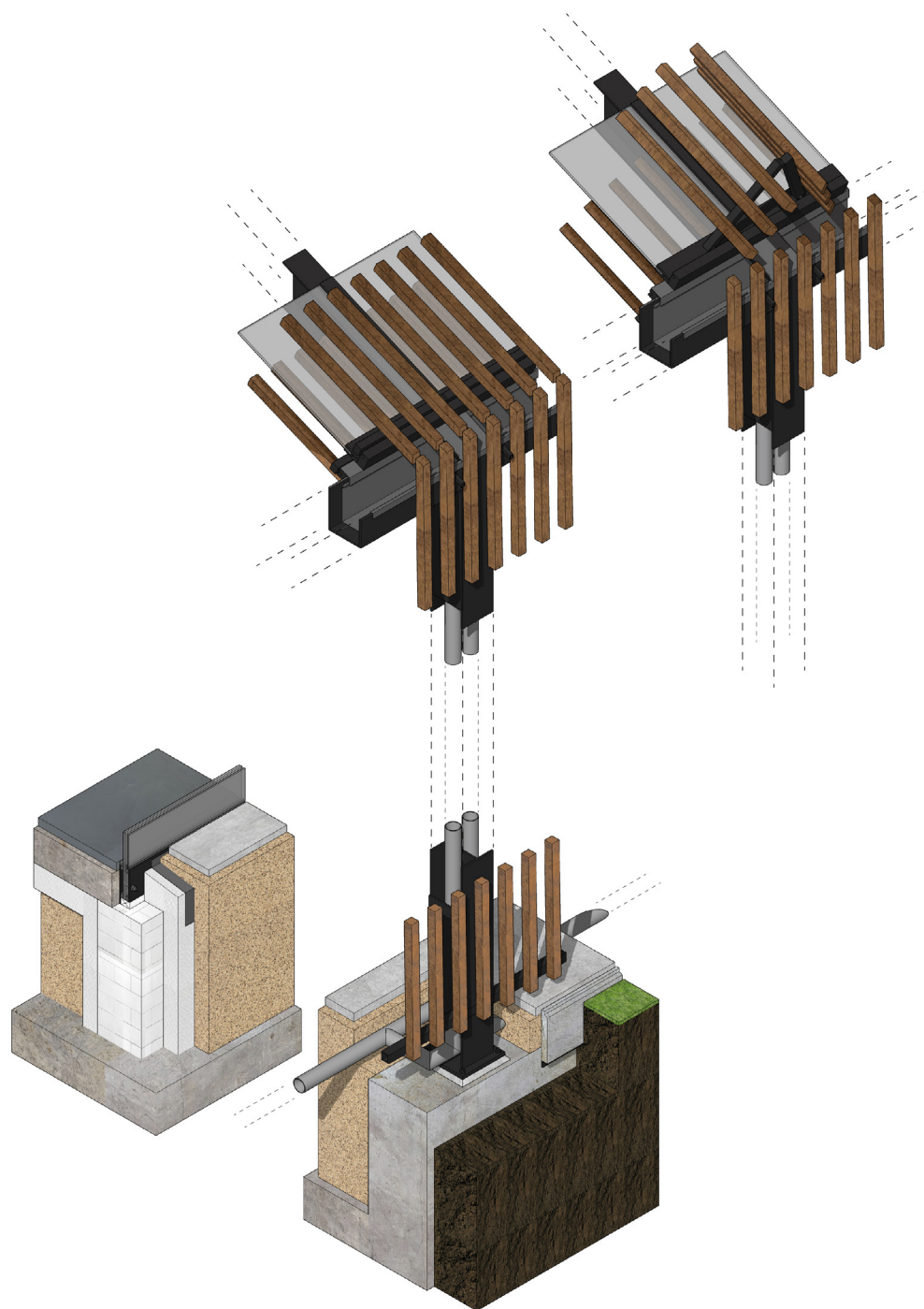


CIRCULAR SYSTEM

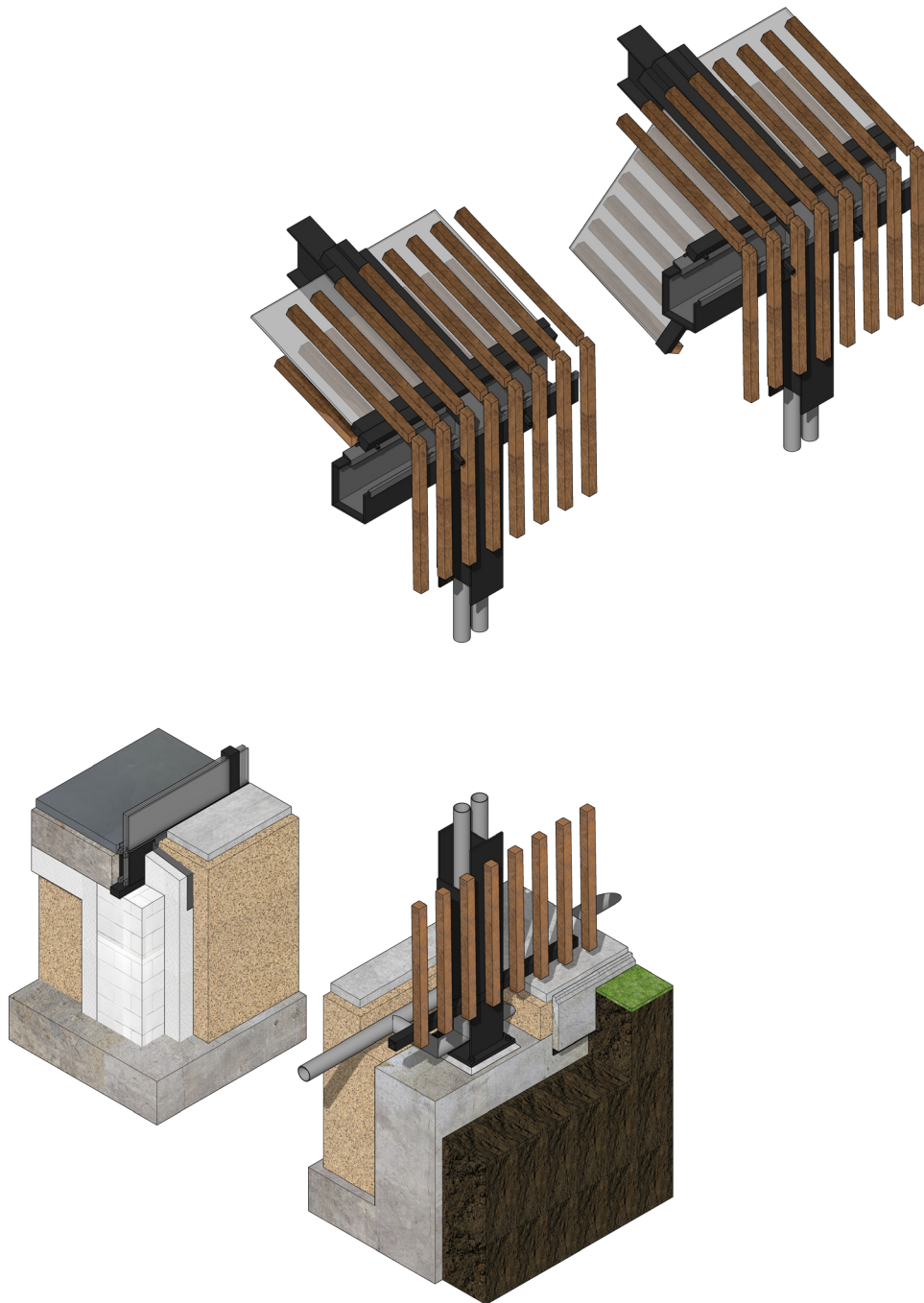
- crops produced for animal food
- manure and residual products
- additives produced for animal food
- heat produced by biogas installation



FIRST IMPRESSIONS SCALE MODEL



DEVELOPMENT PRINCIPLE DETAILS
LOUVRE SYSTEM OUTER - INNER SLATS



FIRST IMPRESSIONS SCALE MODEL

**OPEN WINDOWFRAME
PLASTIC FRAMEWORK ADDED TO GLASS**

