



THE FUTURE SCENE OF A MOUNTAIN
LANDSCAPE

if the rivers played the leading role

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The riverscape of Hemsila

abstract / the future scene of a mountain landscape

The project aims to explore adaptation and strategies for flooding in the riverways of the Norwegian mountain landscape by studying the force of the present and historical landscape, as well as relevant water system-precedents located other places in the world. The goal is to address the flooding problematic in the Norwegian mountain landscapes as well as affording both locals and tourists spaces and places, with certain ambiances and social behaviors beyond the agricultural and floodpreventing purpose.

By regulating water flows the water precedents are staging strategies of how to face adverse natural or man-made factors of aridity, flooding or erosion by routing water, storing water, infiltrating water, filtering water and "keeping the soil moisture"

Landscape modifications and new water systems might be relevant to face the future climate changes, dealing with the dynamic and temporal conditions of precarious landscape events in a mountain climate, as well as restarting the landscape processes of the Norwegian mountain landscape, where everything is connected in an ongoing process forced by the water flow and cycle.

1 PORTRAIT

description and context

1.1 CLIMATE IN NORWEGIAN MOUNTAIN LANDSCAPE

ecosystem

plant and produce

1.2 THE PREVIOUS FARMLAND / THE PRESENT ALPINE

RESORT

the interplay between mountains and valley floor

the river and its leading role

1.3 FLOOD RISK IN NORWEGIAN MOUNTAIN LANDSCAPE

1.4 THE SUBLIME BEAUTY

2 THE FUTURE CULTURAL LANDSCAPE AND THE WATER PRECEDENTS

2.1 ZABO

Water and nutrient cycling: Agri-Aquaculture Systems

2.2 SOLOMON

Water storage, dams and tanks

2.3 TYROL

Water derivation: Leats, Acequias, Levadas

the precedents study in chapters

-general description

-spacial representations / photography/drawing

-satelite image and redrawing

-waterflow diagram

-abstraction drawing watersystem

2.4 THE KEYLINE TEQNIQUE

2.5 PHASE SHIFT PARK

Water meadows, water storage

2.6 PARC DEL AGUA

Space and wayes

3 SITE SELECTION

3.1 HEMSEDAL / TRØYM

A village in a norwegian mountain landscape

3.2 "WITH EDGES AND SLOPES"

Scenario

diploma questions

...how can we deal with the dynamic and temporal conditions of a mountain landscape and prepare for future climate changes through modification of landscape?

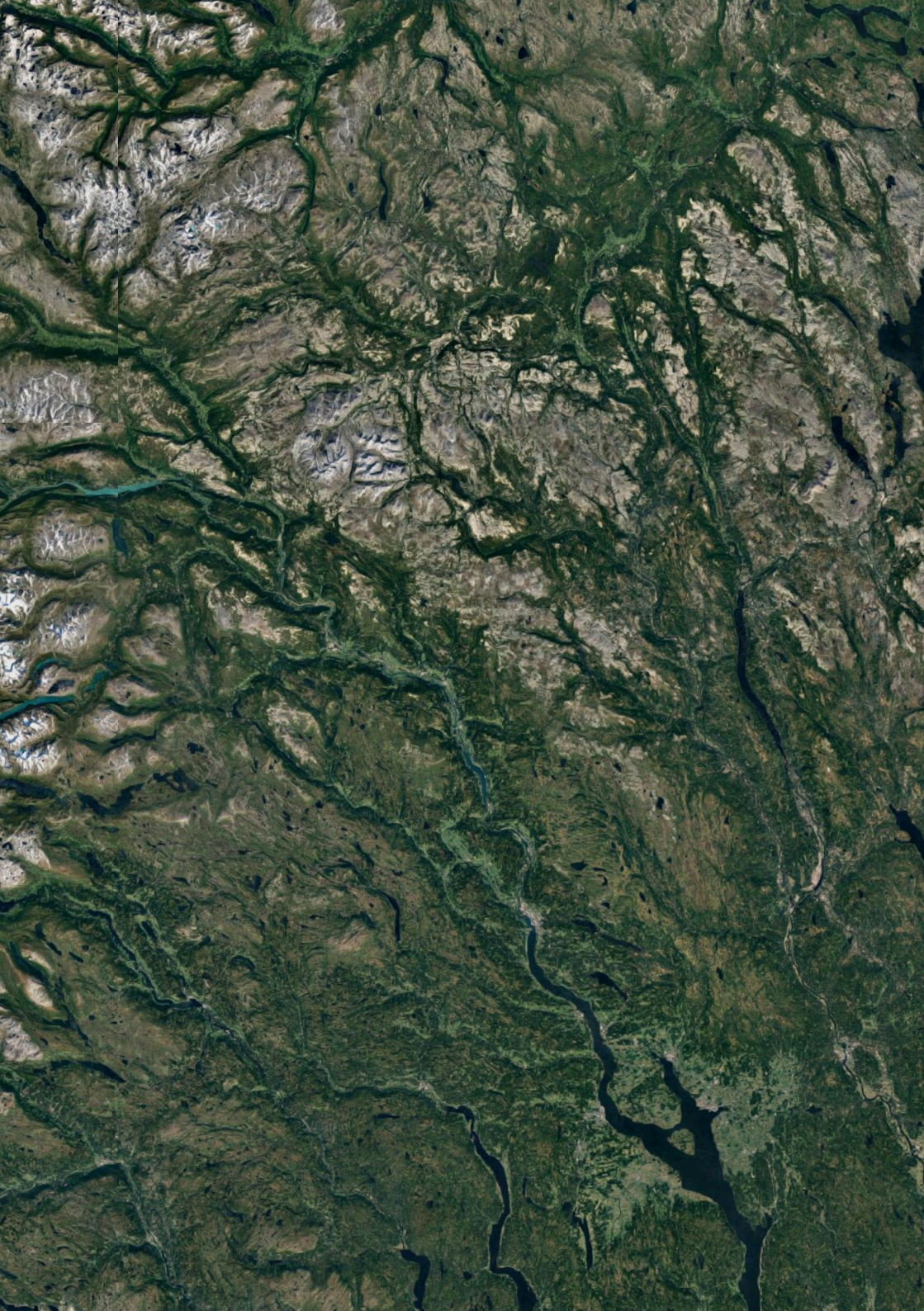
... what kind of landscape and water system can both help prevent flooding and restrengthen local agricultural and farming?

... can the valley floor of an Norwegian alpine landscape again become a foreground?

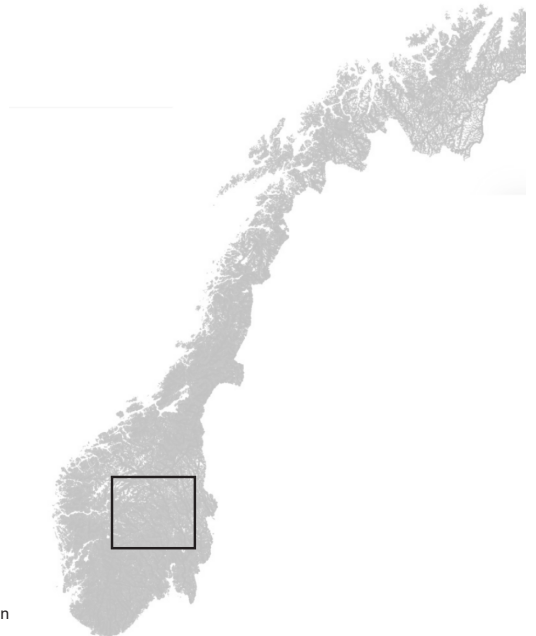
CHAPTER 1 //
PORTRAIT



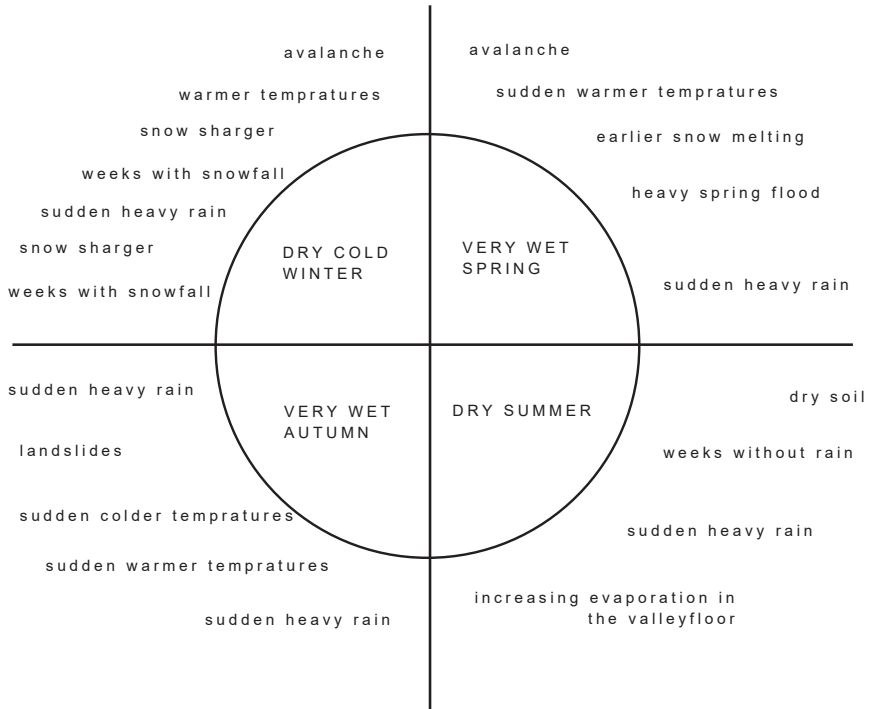
River flood in the Norwegian mountain lanscape



1.1 CLIMATE IN NORWEGIAN MOUNTAIN LANDSCAPE



In the mountain landscapes in
the middle part of Norway the
climate has changed



**Seasonal moments of the present
norwegian mountain landscapea**

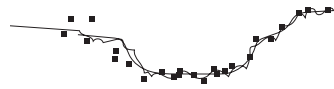


spring flood in Glomma

1.2 THE PREVIOUS AND PRESENT FARMLAND

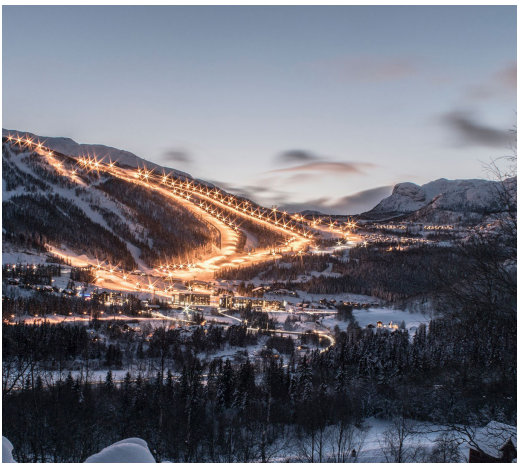


Farmland Hemsedal / Ulsåk



connected

The resources and daily life of a mountain village happened in the whole section of a connected mountain landscape



The Skistar alpine Resort in Hemsedal "everyone is focusing on the mountain resort as a money machine while forgetting the agency of the rivers"



disconnected

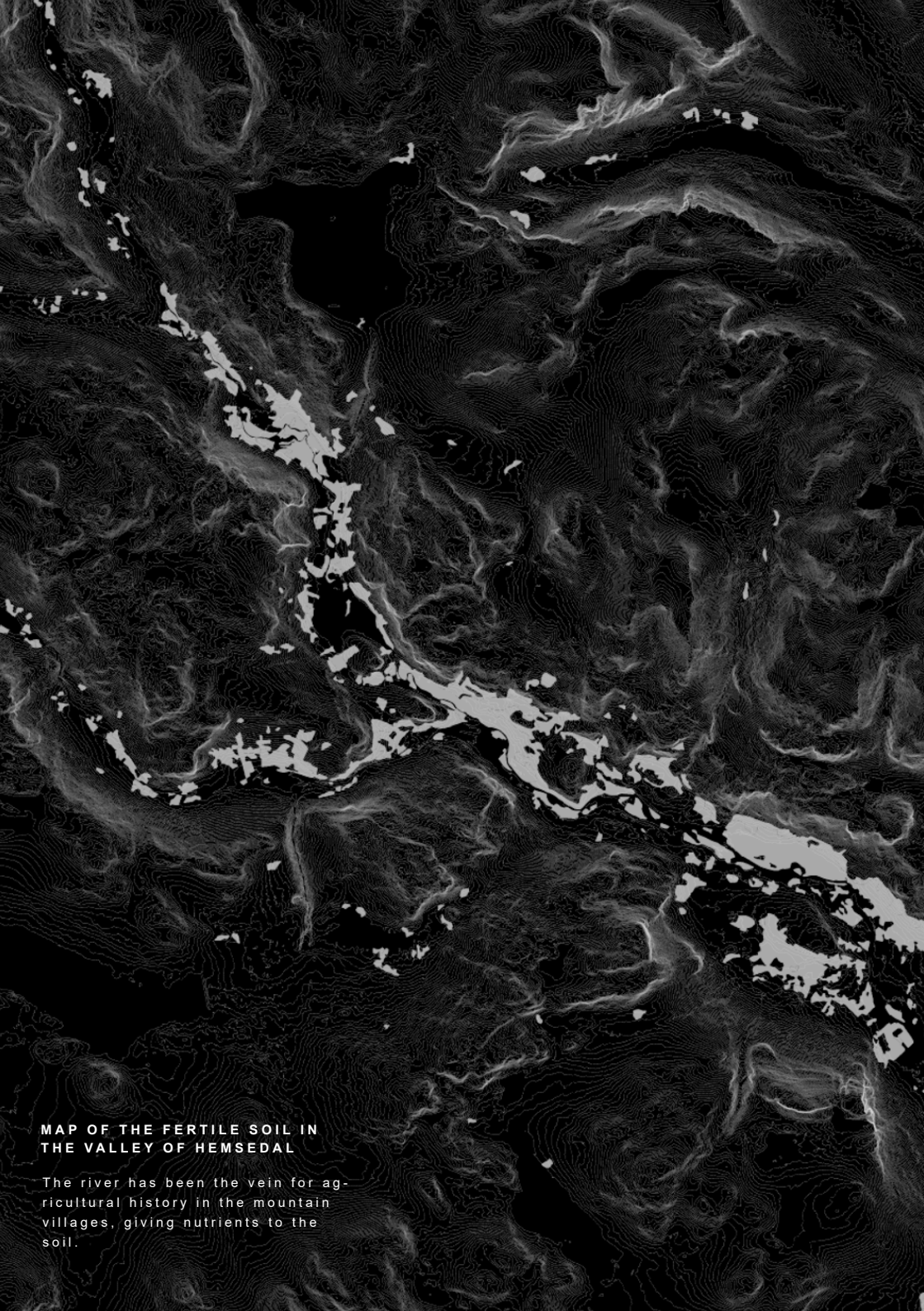
Today the valley floor is left behind to the attraction of the ski-resorts in the mountainsides

The interplay between mountains and valley floor

Back in history the norwegian mountain landscapes had a strong relation to the surrounding landscape and productive land, with fields in the valleyfloor nurtured by the river, handled by the local farmers. The mountains were a place to take the animals to sætere and støler*. The section of the valley with its different landscape entities was highly valued, with the river, in the valley floor as the main force.

The farming industry has been transformed the last 100 years. Machinery, centralization, food regulations and few distribution channels have made the connection between the food grown in the farmland and the meals shared at the local dinner tables challenging to track. Mountainlandscapes have an added level of complexity and because of climate change, drastically affecting the alpine landscapes these communities face new challenges.

Today the main attraction and force of economy of many mountain villages globally is the alpine skiing resorts. The valley floor and the historical farmland is more or less left behind becoming a backdrop to the pull of the mountains. The communities are today more connected to and generated by the alpine than the historical farmland.



**MAP OF THE FERTILE SOIL IN
THE VALLEY OF HEMSEDAL**

The river has been the vein for agricultural history in the mountain villages, giving nutrients to the soil.



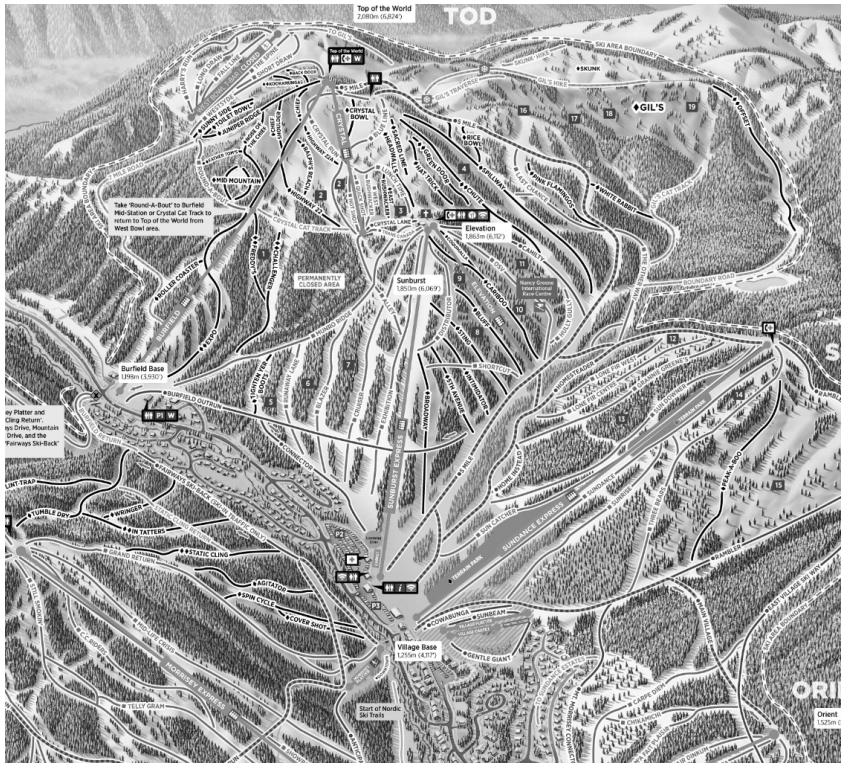
Longplots / deviding land

Støler: structures functioned as satellites to the farms containing functions and program linked to the surrounding nature and landscape. The animals were led from the farms in the valleyfloor and up to the støl in the mountains for grazing.

Longplots: the old way of deviding land to access the two opposing entities and the landscape between them: mountain and river.



Fjellstøl in Hemsedal



TODAYS WAY OF MAPPING THE ALPINE LANDSCAPES AND SKI RISORTS



AN OLD MAPPING OF HEMSILA IN HEMSEDAL, REPRESENTING THE CLOSE RELATION BETWEEN FARMLAND AND RIVER.

Historically the rivers were preformative and present in the landscape and production. Today it has become like a tame arm, following the valley floor almost anonymously because its "forgotten". During spring and other spontaneously moments through the year it is acknowledged and established as problematic because of its flooding and the kommune is looking for ways to "handle" it.

Studying water precedent in mountain landscapes other places in the world, to consider if they will be functional to face the future climate changes will be a method for continuing or restarting the landscape processes of the Norwegian mountain landscape,

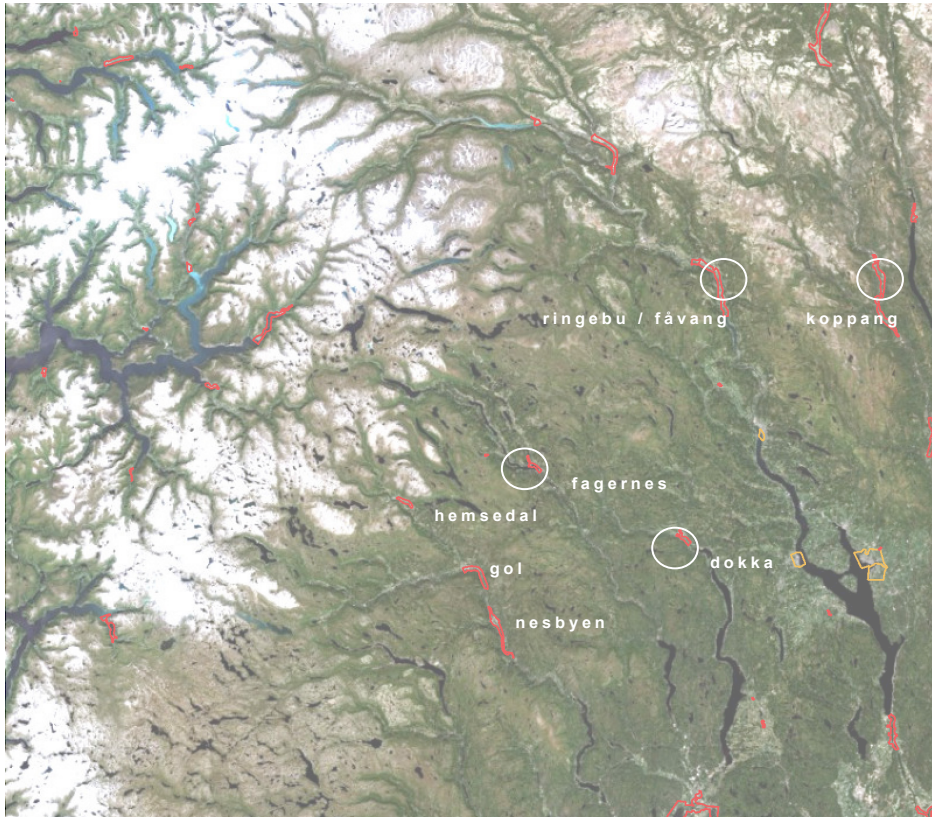
where the landscape is in an ongoing cycle.

Through modification of landscape it might be possible to restart or rethink the landscape "machine" "motor" or force, where the human no longer has the role as preventers or disruptors, but as participants within the cycle of the landscape.



Hemsedal ski resort

1.3 FLOOD RISK IN THE NORWEGIAN MOUNTAIN LANDSCAPE



The river is today seen as problematic. A mapping from NVE (norwegian water network) locate areas and rivers with flooding risks in middle Norway. Many of them in mountain landscapes.

There are four sites highlighted in the map; The rivershed of Lågen which affects the communities along it, as Ringebu and Koppvang. The river Hemsil runs through the valley of Hemsedal, and Hallingdalsvassdraget through Gol and Nesbyen. How can landscape modifications facilitate for the preformative river of today?



flooding in Lågen / Fagernes



flooding in Lågen/ Koppang / Lesja



flooding and wetmark Dokka-Etna- Randsfjorden / Dokka



flooding in Lågen / Ringebu



Storofsen 1700
Sarfsfossen // Erik Pauelsen

*Storofsen, a flood in the mountain areas in
the middle part of Norway in the 1700.*

1.4 THE SUBLIME BEAUTY

Storofsen - also referred to as Ofsen - was a flood disaster that struck eastern Norway in July 1789 during which people vanished, thousands of houses were destroyed and thousands of livestock killed. The rivers Glomma and Gudbrandsdalslågen flooded their banks and the waters of Lake Mjøsa rose ten meters above their normal level. A long cold winter were suddenly released by sudden warm and weeks with rain. The melting started, the rain continued and the rivers changed colours and found new ways. A life base was damaged. The flood is documented through paintings and stories and its still the biggest flood of Norwegian history. The sublime beauty of the flood were captured by painters. Its dramatic and spacial apperance were represented as terrifying, facinating and beautiful.



CHAPTER 2
THE FUTURE CULTURAL
LANDSCAPE AND THE
WATER PRECEDENTS



from the keyline technique / P A
Yeomans-Keyline / Kiewa valley

Modification of energy, water and nutrient flows through history, facilitation for human inhabitation, and agricultural production.

Studying cultural landscapes and water precedents other places in the world that facilitated for growth of plants in arid regions, or turned swampy lands into lasting hydro-agriculture, to understand how landscape modifications can generate the processes of a landscape with water as main-force. These can be seen as "local hydrosphere modifications". By regulating water flows in quantitatively and qualitatively they staging strategies of how to face adverse natural or man-made factors of aridity, flooding or erosion by routing, water, storing water, infiltrating water, filtering water and keeping moisture. One could say, they perform the "ecosystem services" of regulating aspects of the hydrosphere and therefore also regulating climate. They certainly increase ecological productivity, supporting flora and fauna. Often they are marked by a precision that stems from a careful consideration of the very locality, physically and socially.



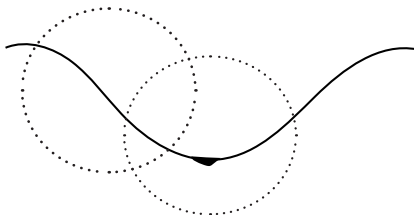
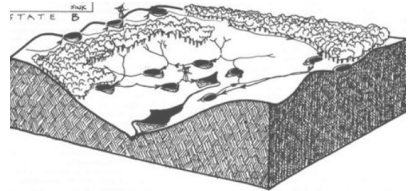
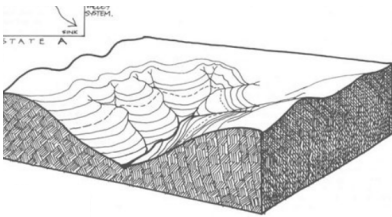
Hold and
infiltrate



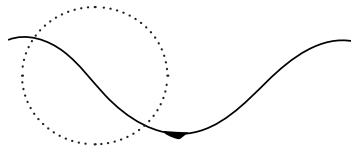
Delay



Give space and
ways



By establishing strategies for controlling water in the mountain sides there will be possible to prevent and regulate uncontrolled flooding in the valley floors. The following precedents are originally for agricultural purpose but can be transferred as water systems for delaying and storing water, as flood strategies.



PRECEDENTS //

WATER STRATEGIES IN THE VALLEY SIDES

Water derivation, delay, infiltrate and hold

1 Water and nutrient cycling: Agri-Aquaculture Systems

- Zabo, Nagaland, India (monsoon climate)

2 Water derivation: Leats, Acequias, Levadas

- Water meadows, e.g. the case of Stanz-Grins, Tyrol, Austria

3 Water storage: Solomons Pools, Israel



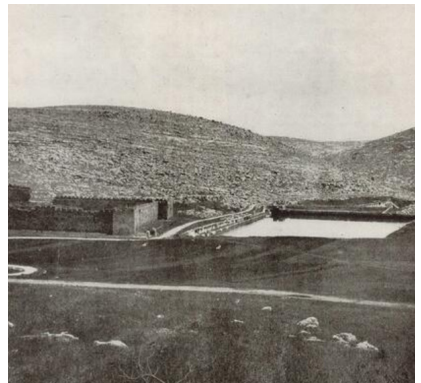
Tyrol



Zabo



Solomon pools



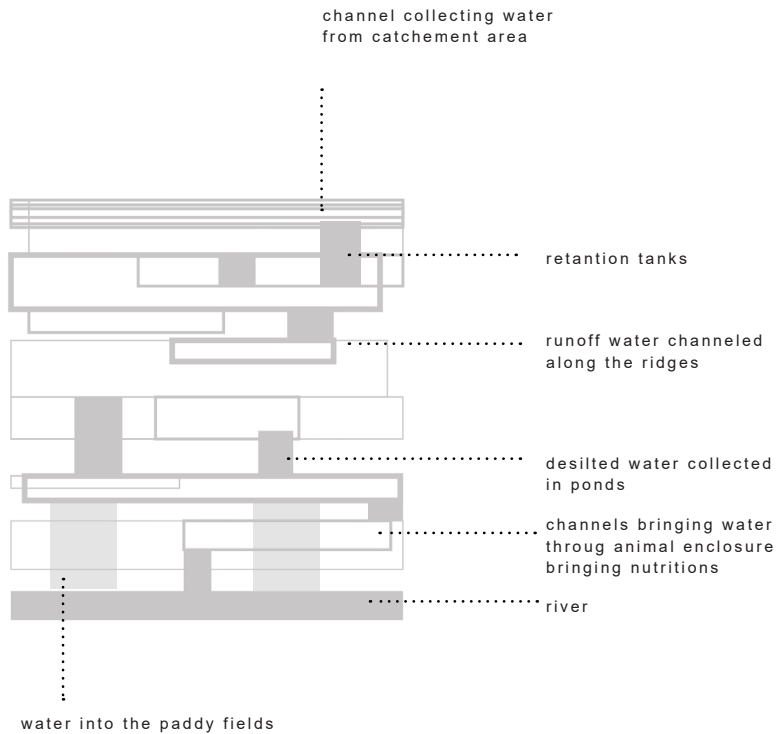
Solomon pools

The climate in the norwegian mountain landscape has changed because of higher tempartures, dryer summers and more rain. The chosen water precedents are located in landscape conditions that can be relatable to the present and future climate of the norwegian mountain climate. By studying, redraw and modifying the water precedents there might be possible to establish if they can be placed within the norwegian mointain landscape as a strategy to face the future climate and the flood.

2.1 ZABO
Water and nutrient cycling:
Agri-Aquaculture Systems







Zabo is a indigenous terraced irrigation system that combines hill-top forestry, water-harvesting, horticulture, agriculture and animal husbandry. The zabo is found in subtropical to temperate climates and the structure extends on steep slopes from upper story forest to the lower story stream. The system manages to turn a steep mountainside into a landscape of terraced platforms, where water is distributed evenly with dividing walls, open channels and bamboo pipes, to maintain a controlled water level on each zabo terrace.

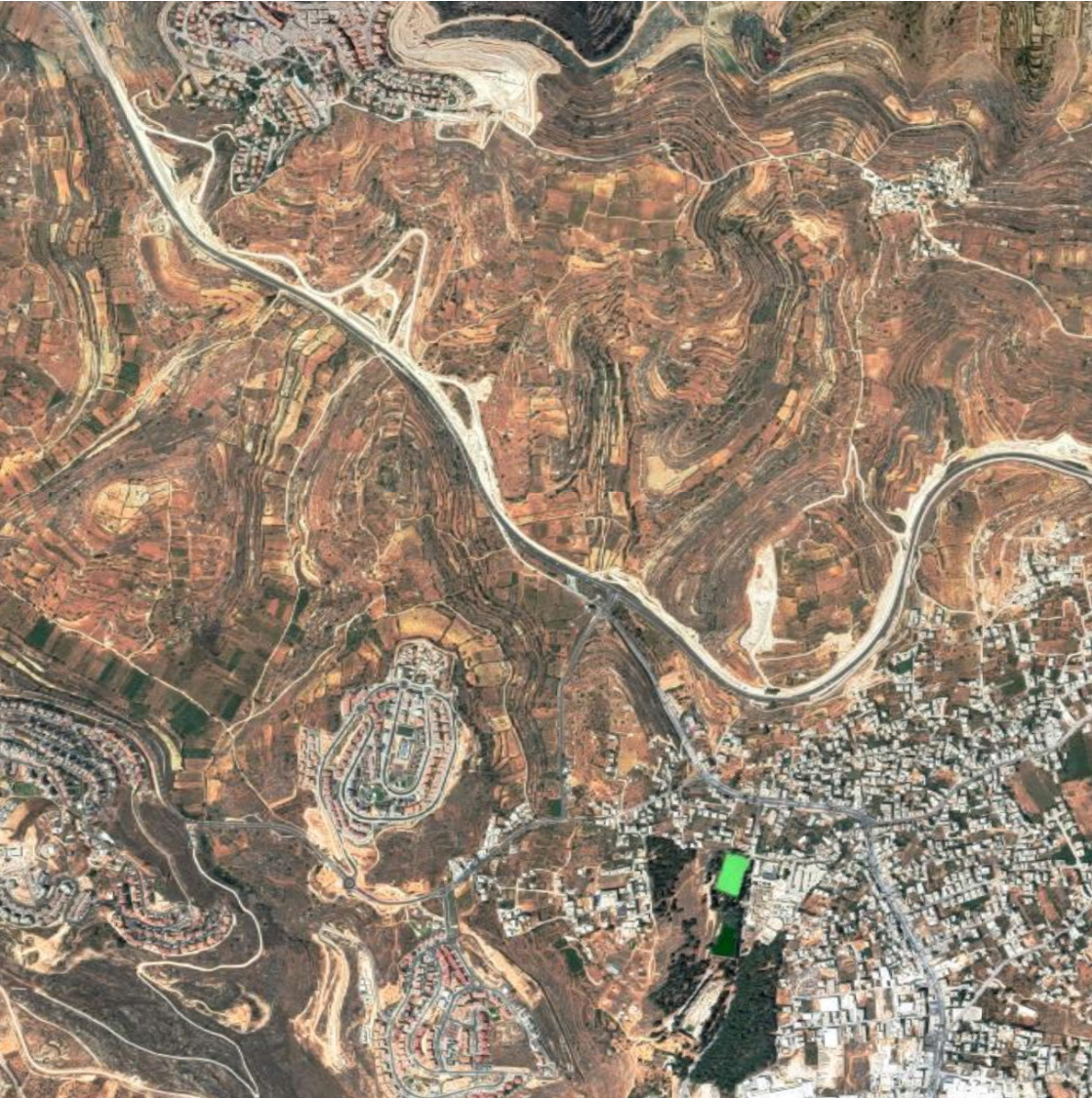
The zabo (the word means 'impounding run-off') system is practiced in Nagaland in north-eastern India. Also known as the ruza system, it combines water conservation with forestry, agriculture and animal care. Villages such as Kikruma, where zabos are found even today, are located on a high ridge. Though drinking water is a major problem, the area receives high rainfall. The rain falls on a patch of protected forest on the hilltop; as the water runs off along the slope, it passes through various terraces. The water is collected in pond-like structures in the middle terraces; below are cattle yards, and towards the foot of the hill are paddy fields, where the run-off ultimately meanders into

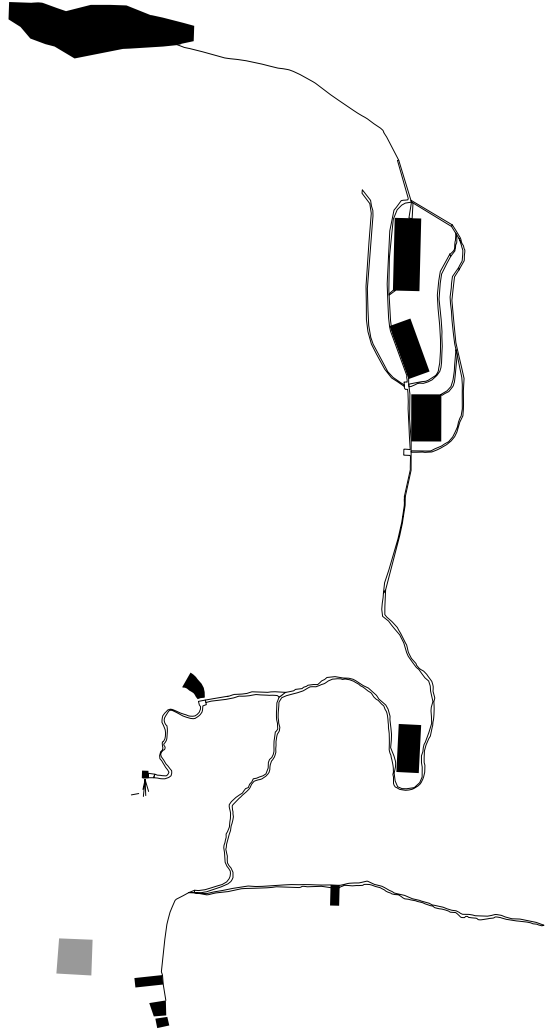


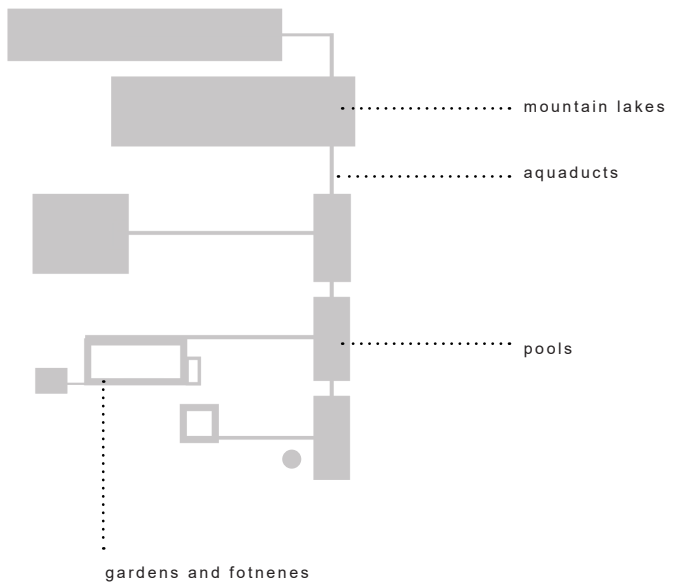


2.2 SOLOMON

Water storage, dams and tanks



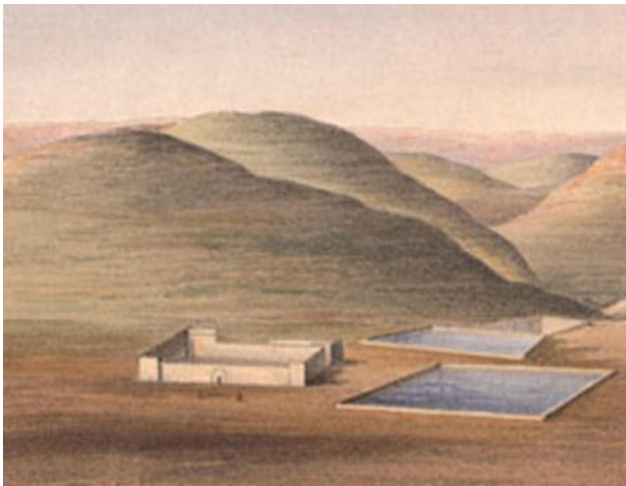




Solomon, who ruled about 970–931 B.C., is said to have developed vineyards, gardens, and pools.

I made great works. I built houses and planted vineyards for myself. I made myself gardens and parks, and planted in them all kinds of fruit trees. I made myself pools from which to water the forest of growing trees. (Ecclesiastes 2:4-6 ESV)

Several springs feed into the “pools of Solomon” from the south through two aqueducts. From the western pool a high level aqueduct carried water to the Upper City of Jerusalem. From the easternmost pool a low level aqueduct carried water to the Temple Mount.



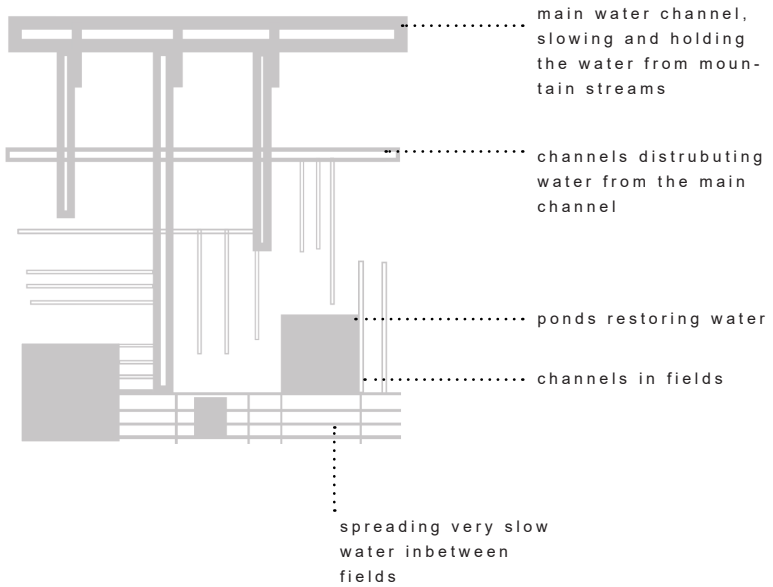


2.3 TYROL

Water derivation: Leats,
Acequias, Levadas







Characteristic technique of water diversion in alpine irrigation systems with contour canal and tools. The basis of the object of study is a centuries-old tradition for the irrigation of inner-alpine dry areas, the so-called Rieselbewässerung, which has become an intangible cultural heritage of Austria.

In Austria's regions flows the Inn River, which supplies large parts of the Tyrolean Oberland with water through its tributaries to the irrigation systems. Traditional hillside irrigation is practised in the municipalities of Ried, Prutz, Tarrenz, Grins and Stanz, whereas valley floor irrigation systems are practised in the flat-lying areas of Haiming, W. Hence, the overall aim of irrigation is to drain water to dry those mountain valleys and the same in abundance. Alpine pastures, meadows and farmland primarily serve to cultivate the valleys. However, productivity takes place in a traditional way. This has a positive effect on the flora and fauna and a balanced ecosystem. Additional ponds create a breeding ground for a biodiverse cultural landscape and thus raise awareness for the sustainable use of water as a resource.

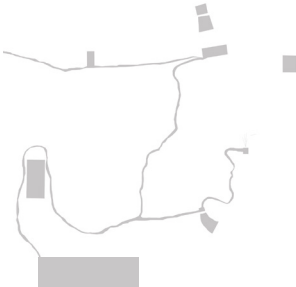
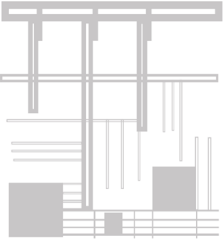
The water is diverted from a stream into the main channel, through which it flows downhill at a shallow angle to reach the areas to be irrigated. Each landowner has water times of the so-called water wheel (German=Wasserrad). Each of these landowners is relieved by the next after a 6-hour shift for their own field irrigation. E.g. 6am-12pm, 12pm-6pm, 6pm-2pm and 24-6pm. This time period moves in a weekly cycle from year to year by one day a week, creating individual irrigation conditions and equal opportunities. Each individual depends on a functioning community and system in order to avoid social differences within the village and collective impact by displacements of the water wheel.



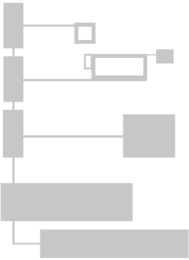




Tyrol



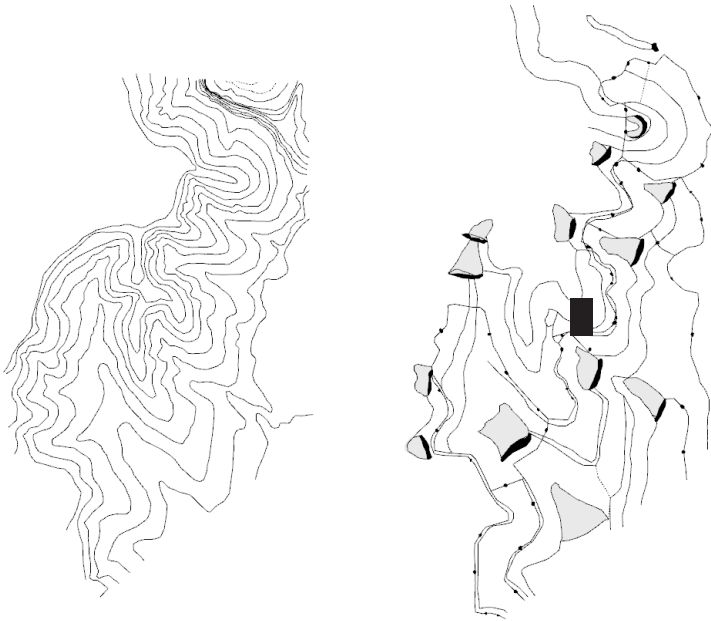
Solomonss pools



Zabo



2.4 KEYLINE An integration of various techniques

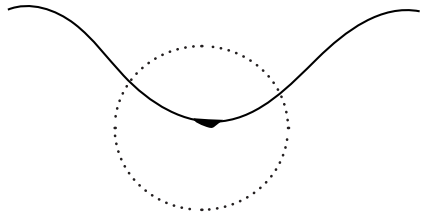


Keyline plans for the control and re-direction of run-off water, where ever practical, into super-sized farm dams for later use by gravity powered rapid flood irrigation.

Keyline is the natural way to defeat the menace of soil erosion and salinity. It achieves this as an incidental to total landscape betterment.

Keyline methods increase the "field capacity" of the land. It will quickly absorb and hold more water. The extra humus and depth of soil prevent the leaching of nutrients including salt.





PRECEDENTS //

WATER STRATEGIES IN THE VALLEY FLOOR

Water derivation, delay, infiltrate and hold

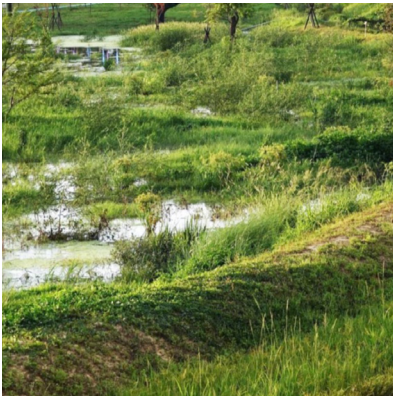
1 Water meadows, water storage:

Phase Shifts Park

- Taichung Central Park, Taiwan, Taichung City, Xitun District, Taichung, Taiwan

2 Space and ways: Parque del Agua

- Zaragoza



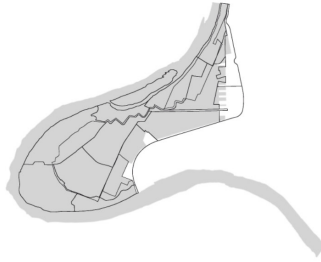
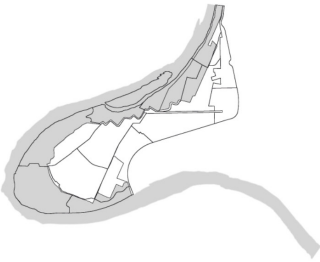
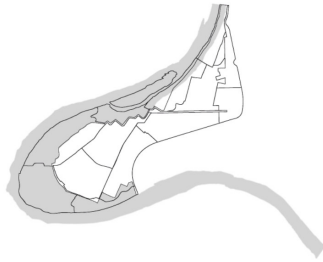
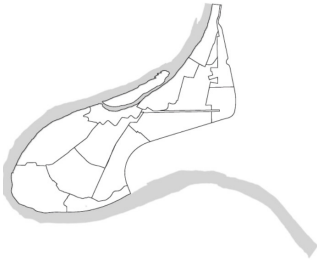
Parc del aqua



Phase shifts park

2.5 PARQUE DEL AGUA, ZARAGOZA
L'Atelier du Paysage





Parque del Agua was established in Zaragoza, Spain as part of the 2008 Water and Sustainable Development International Expo. Built on 140 hectares of unused, abandoned cropland and bordered by canals, Parque del Agua is one of the largest parks in Spain and attracts visitors from all over the world.

A park enrolled in the green-strip of the river Ebro and in its history traces, which assumes its condition understanding that there exists an appreciation to its singular location, a meander of a river full of energy and an owner of its essential dynamics. The imagined history for inventing the park is to recognize the origin of silver forest, to extend it and to install us inside, placing meadows, planning the layout of the water like those of farmers did. The park has a purpose to maintain not only its functionality during the avenues but also the role of the meander like an expanding area, which offers a space of undercurrent and natural filtering through the vegetation; therefore the river can dissipate energy and to lead back water down. The areas of bath, the more designed parts and the buildings are protected from flood while the river forest, as is needed by its nature, will be covered by the Ebro waters, redrawing the parks edges.



2.6 PHASE SHIFTS PARK
Taichung Central Park





Mosbach Paysagistes collaborated with Philippe Rahm Architectes and Ricky Liu & Associates Architects + Planners for the project, which is also known as Jade Eco Park. The park, built on the site of Taichung's old airport, includes undulating surfaces that channel rainwater, as well as outdoor play areas for families and sports facilities, all connected by winding pathways. Taiwan has a humid subtropical climate, warmed by the Kuroshio ocean current. The park is designed to create pockets of fresher, cleaner air through landscaping and technology. Roads have been partially buried, with tunnels underneath hummocks that provide hills for people to walk over and cut down on traffic pollution. Mosbach Paysagistes designed different gardens around Phase Shifts Park, each with different native plants to encourage certain local insects and wildlife. The spaces shift and change in an ongoing process or cyclus of water.



**CHAPTER 3 SITE /
HEMSEDAL / TRØYM**

3.1 HEMSEDAL / TRØYM
the norwegian muntain village



A winter-field in the valley floor of Hemsedal with traces of old water channels, leading water into the fields and also functioned as drainage system



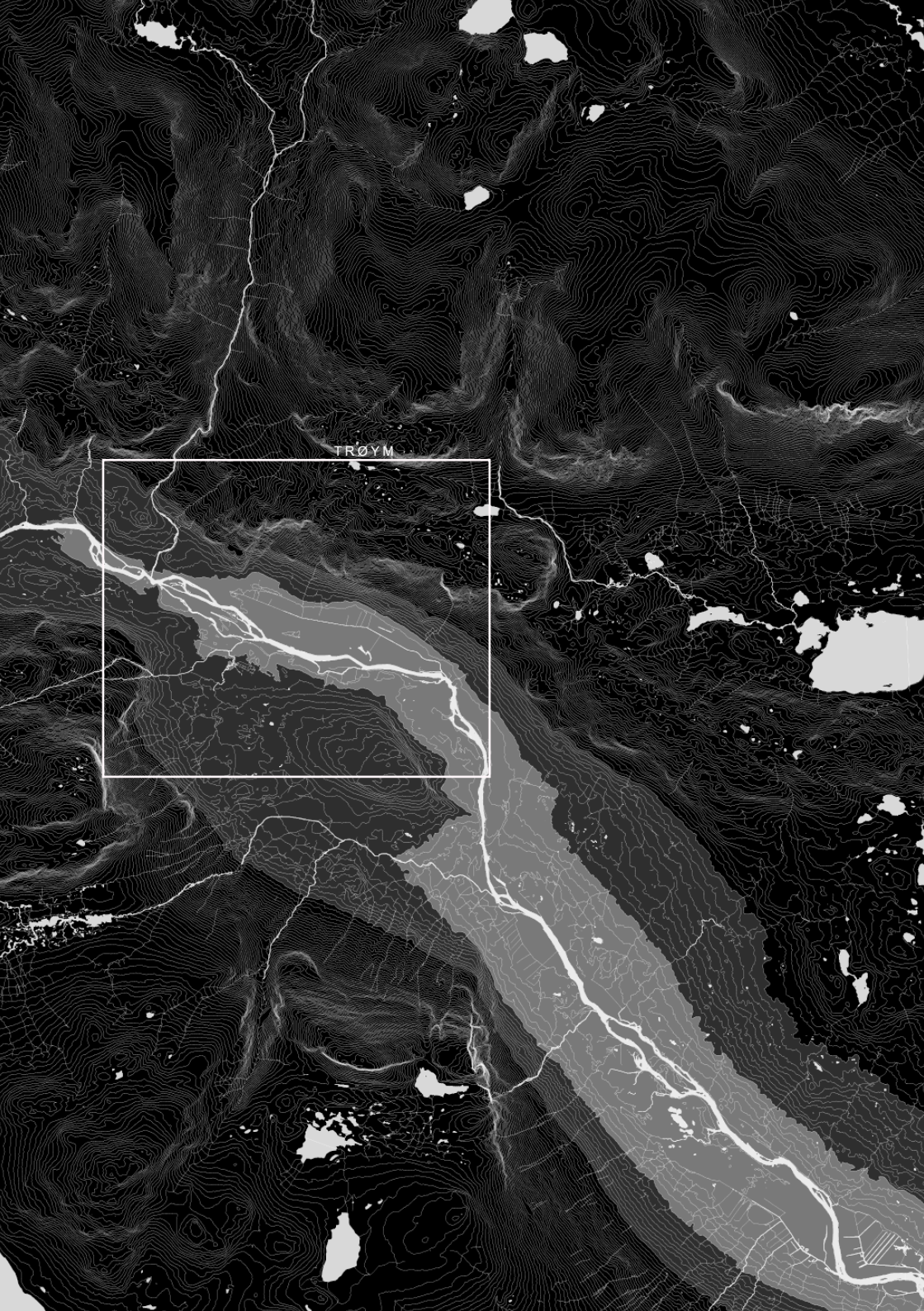
*living on the edge in Trøym in
Hemsedal*

Trøym in Hemsedal is a typical site of a norwegian mountain village. During flood the valley floor transform into a blanket of water. The streams from the mountains, the heavy springfloods and rain fill the river over its edges. The present "attitude" of Trøym village in Hemsedal is "living on the edge" of the river, with its settlements placed closed to the potential flood plain.





HEMSEDAL / TRØYM AND THE FLOOD SPACE



TRØYM


3.2 WITH EDGES AND SLOPES Scenario



the floodplane as a living / changing system



with edges and slopes



Most Important Questions. Landscape
Journal. Litton R. Burton, et al

*What is the impact of designed nature
on nature's capacity to heal and restore?
Those who study the web of nature like
to point out that everything is ultimately
connected to everything else*

*scenographic and political origins to de-
fine landscape as a geographic area wit-
hin which humans order space and time*

*Writers, artists, and researchers of mul-
tiple persuasions warn us of the conse-
quences of our accelerating disassociati-
on from the world around us*



Riverscape of Heimsil, Hemsedal, 1931.