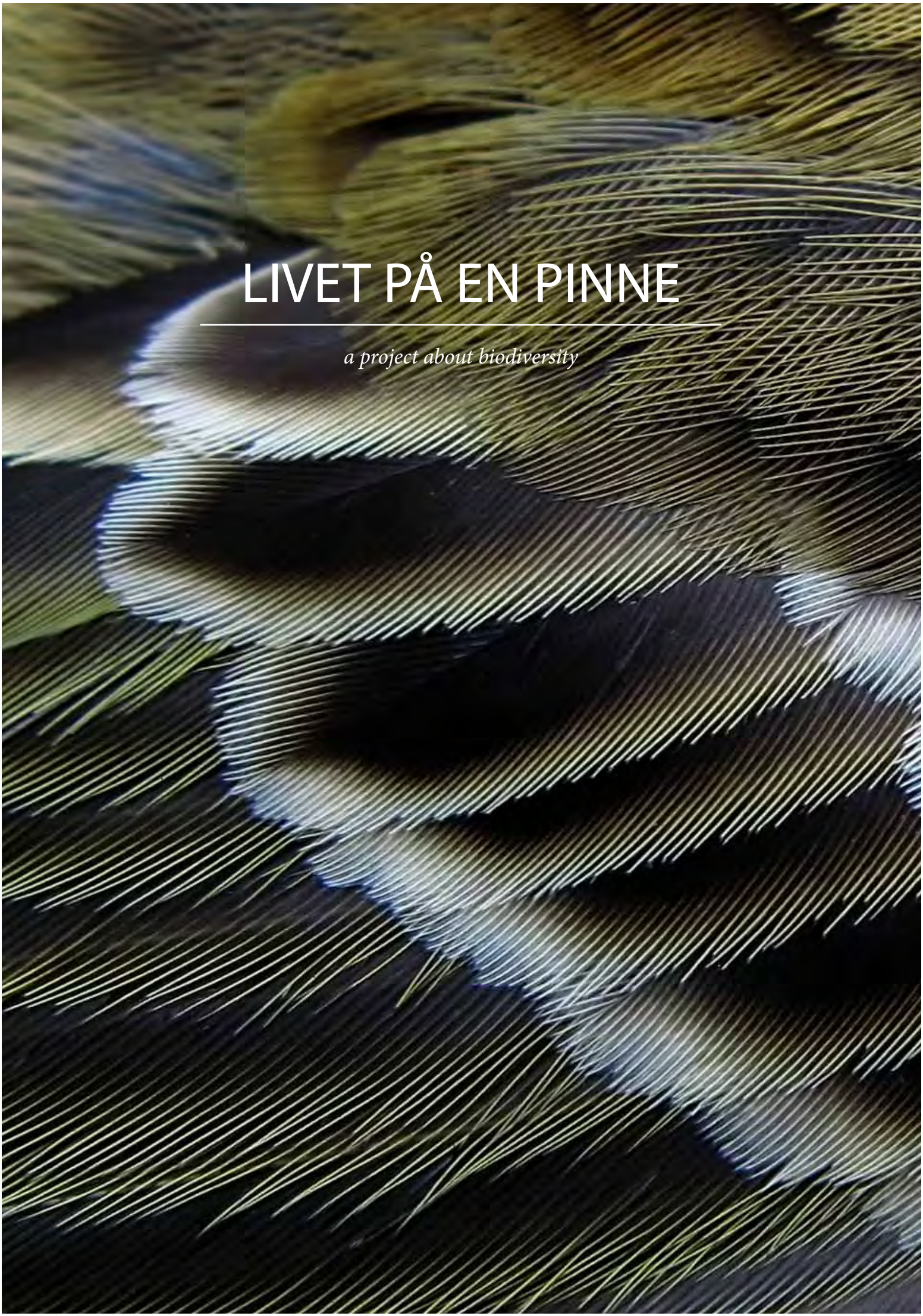

LIVET PÅ EN PINNE

a project about biodiversity

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ABSTRACT

"Livet på en pinne" is a Swedish expression for having a carefree life, just like a bird. Unfortunately this is not the case in Sweden anymore. Birds are decreasing in numbers day by day as a result of our actions and most severe is the situation within the intensified agricultural landscape.

The goal with this project is therefor to increase the birds chance of survival by increasing the biodiversity within the landscape. This resulted in an artificial biotope that will create habitats for insects. The insects will in turn help the farmers with pollination and pest control on their land and become an important food source for the birds. The biotope will additionally provide the birds with water for them to drink and clean their feathers in. By integrating this artificial biotope into the intensified agricultural landscape a more diverse environment could be created that could benefit both birds and farmers.

"Livet på en pinne" är ett svenskt uttryck för att ha ett bekymmersfritt liv, precis som en fågel. Detta är dock inte längre fallet. Antalet fåglar i Sverige minskar för varje dag som går till följd av våra handlingar och mest kritisk är situationen i det intensifierade jordbrukslandskapet.

Målet med detta projekt är därför att öka fåglarnas chans till överlevnad genom att öka den biologiska mångfalden i landskapet. Detta resulterade i en konstgjord biotop där livsmiljöer för insekter kommer att skapas. Insekterna kommer i sin tur att hjälpa jordbruket med pollinering och bekämpning av skadedjur men också vara en viktig födokälla för fåglarna. Biotopen kommer dessutom att förse fåglarna med vatten att dricka och rengöra sina fjädrar i. Genom att integrera denna konstgjorda biotop i det intensifierade jordbrukslandskapet kommer en mer varierad miljö att skapas vilket gynnar såväl fåglar och bönder.

SUMMARY

This is a master thesis in industrial design by Emma Nilsson. The vision with the project was to find new ways of maintaining our biodiversity and increase the interest of doing that. Because this is a complex and time consuming task demarcations had to be setup. After investigating different problem areas connected to biodiversity within Sweden one of the most severe was chosen to work with. This project was therefor focusing on how to increase the chance of survival for the bird species living within the Swedish agricultural landscape. Due to higher demands of product on the market and fewer available agriculture the farmers has been forced to make changes to the landscape to intensify their production. These changes has reduced the biodiversity within the area and thereby also the availability of food, habitat and shelter for the agricultural birds.

First desktop research was carried out to increase the level of knowledge. Then field trips and interviews was performed to increase the understanding of the problem. After analysing the research, four parts was selected as a foundation for the ideation phase. Birds was the first choice because their threatened existence was the starting point of the project. The reasons why the birds are decreasing in numbers is closely linked to the changes made by the farmers when intensifying the agriculture. Therefor the farmers was the second choice. One of the most common changes made to a farm is to remove small biotope. These areas are important oasis for the farming birds. Therefor this was the third choice. The removal of biotope does not only threaten birds but also insects which is an important factor in the survival of birds. Insects are the main food source for the farming birds and by pollinating plants they also provide the birds with fruit, berried and seeds. Therefor insects was the forth choice. In the ideation phase a concept of an artificial biotope was developed. The biotope had to fulfil different demands such as creating habitats for insects, providing birds with water and to not become an obstacle in the fields when farming. Through mock up, prototypes and evaluations this was possible to manage.

The end result was a module designed to mimic a natural biotope that could be place within the intensified agricultural landscape. By placing rest materials already existing on a farm such as stones, wood and leaves into the module habitats for useful insects could be created. The top of the module was designed to collect rainwater to provide the birds with a water source. A minimal need of maintenance and reduced production costs was considered to facilitate the usage of the product. The module will be placed at rest areas on the farm which are areas that is not used for cultivation. This placement is carefully chosen to not create a new farming obstacle for the farmers.

With the help of this product my hope is that the biodiversity within the agriculture will increase and a greater discussion around the issue will rise.

INTRODUCTION

getting started and planning the project

TABLE OF CONTENT

STARTING POINT

To find an interesting and inspiring theme for the master thesis was important for me. Therefor a main goal for the project was decided. I wanted this project to reflect me as a person with my interest and background. I also wanted it to reflect me as a designer with my strengths in focus.

Animals and nature has always played an important part in my life and is today one of my biggest interest. Therefor this was the starting point in my search for a suitable theme.

Nature is a complex system that is depending on biodiversity to function. Biodiversity provides us with a nature from where we get oxygen to breath and food to eat. It also gives us unforgettable aesthetic experiences that could be seen as part of our welfare. Besides all the benefits it brings, the nature has an own value where all species has the right to exist.

Sweden is one out of many countries that has signed the UN Convention on Biological Diversity, CBD. The goal for these countries is to maintain and sustainable use their biodiversity. The convention gives guidelines, working programs and recommendations on how to reach this goal. All working programs and guidelines has been incorporated and adapted to suit each country. To meet the demands in the convention important work has to been done by both civilians and nonprofit organizations. But there are still a long way to go. The goals that was set up in CBD for 2010, was not reached, which shows that there is still work to be done.[1]

One company working within this field that always has inspired me with their projects is the World Wide Fund for Nature. To get more information about previous work and upcoming projects they were contacted. After describing my background and the intentions with the master thesis I got the suggestion to work with endangered birds species.

Birds are the type of animals that are decreasing fastest in Sweden. All birds have their own ecological niche and are therefore sensitive for changes in their living environment. In Sweden there are 88 bird spices that are threatened according to the red list from 2010. During the 19th century one bird was extinct in Sweden and during the 20th century, seven. This shows a drastic change.

Birds are not something completely unfamiliar to me but actually the starting point of my interest for animals and nature. Growing up with an engaged ornithologist as a father has clearly left its marks. Already as a child I followed him banding birds in the forest.

The fact that I always lived close to the forest has also boosted this interest and gave me the possibility to develop it. When living close to nature you could clearly see the benefits of it but you also notices the changes. It is important to take care of our nature because without it we are nothing. You might think that one bird more or less will not make a difference but it does. Our ecosystem are very complex and if any part of the chain is vanishing the whole system will change.

In this project I hope to find ways to maintain our biodiversity by helping the endangered birds. My hope is that the many generations after me also will have the possibility to enjoy bird songs in the spring.

Common Ringed Plover or Ringed Plover (charadrius hiaticula)

PROBLEM AREAS

As said earlier, all birds has their own ecological niche which makes them very sensitive for changes in their living environment. Therefor they are also important environmental indicators. If birds are decreasing in a specific area it is an indication of that the environment is changing.

To find out what type of changes, in our environment, that is most severe for the Swedish birds WWF was consulted. Six mayor problem areas was pointed out.

1. The forest birds are effected by the forestry where trees, which serve as important feeding and breeding areas, are cut down without consideration of the effect for the bird life.

2. The intensified agriculture has made changes to the landscape. This has resulted in that many agricultural bird species no longer can survive in the area.

3. The development of wind power has effected the migratory birds. The wind power stations are usually placed where the birds have their migration routs and therefor birds occasionally get hit by the blades

4. The fishing industry in the Baltic sea is reducing the sea bird population. When fishing with nets sea birds often get caught in the nets.

5. The use of pollutants effect all types of birds. Oil and pest controllers are just two examples that are contaminating the living environments for birds.

6. The increased hiking tracks effect the birds breeding in the area. If a hiker gets to close to a nest during the breeding period the adults could abandon their eggs and the yearly clutch will die.[3]

A global problem within all these areas is the lack of knowledge. A lot of people and companies are not aware of how the changes made to the environment effect the birds.

To find a problem area to focus on in the project a more in depth research within the different fields had to be done and limitations have been setup.

1

2

3

4

5

6

DEMARCATIONS

The Swedish birds are facing many different challenges and to reduce them all is a complex task. Due to the time limitation of the project it was necessary to imitate the research area.

The majority of the 10 000 existing bird species are migratory birds and does a seasonal journey to find food and breeding areas. This means that there are not one specific environment effecting the birds but all the environments along their route. To limit the research area it was chosen to work with the situation in Sweden because this is where the project is executed and from where most of the information will be gathered.

After researching the problem areas that WWF had been pointed out and after contacting SOF, the Swedish ornithologist cooperation, it showed that some areas were more sever then others. The pollutions, the forestry and the agriculture.

To regulate and decrease the pollutants in the environment is a difficult task to handle by one single person. To be able to succeed you will need new laws, an increased engagement among bigger companies and a collective effort. Therefor this problem area was put aside for this project even if it is a very important issue to solve.

The forestry and agriculture effect the birds in similar way. The changes made to the environment removes their breeding places and feeding areas.

Because of our mass consumption there is always a demand of products on the market. This creates a need for the industries to become more efficient. When changing the industries to become more efficient there are many other aspects that are forgotten. This is something occurring both in the Swedish forestry and agriculture. Within these businesses the importance of biodiversity has been put aside.

Besides the similarity of the businesses there are also differences that had to be considered before choosing which problem area to focus on. The differences in ownership and how the business is managed is here of great importance Sweden 40% of the forests are owned by state owned companies.[4] When these companies are managing the forests it is difficult for civilians, that is not involved in the industry, to notice the consequences of the actions. This makes it possible for the business to continuing in the same way year after year.

In comparison the Swedish agriculture is dominantly owned by private persons, the farmers. What is interesting in this case is that the farmers actually lives on the land they work, which makes them face the consequences of their actions directly. Therefor they are usually also more open towards changes that could improve the not only the business nut also the environment on the farm.[4]

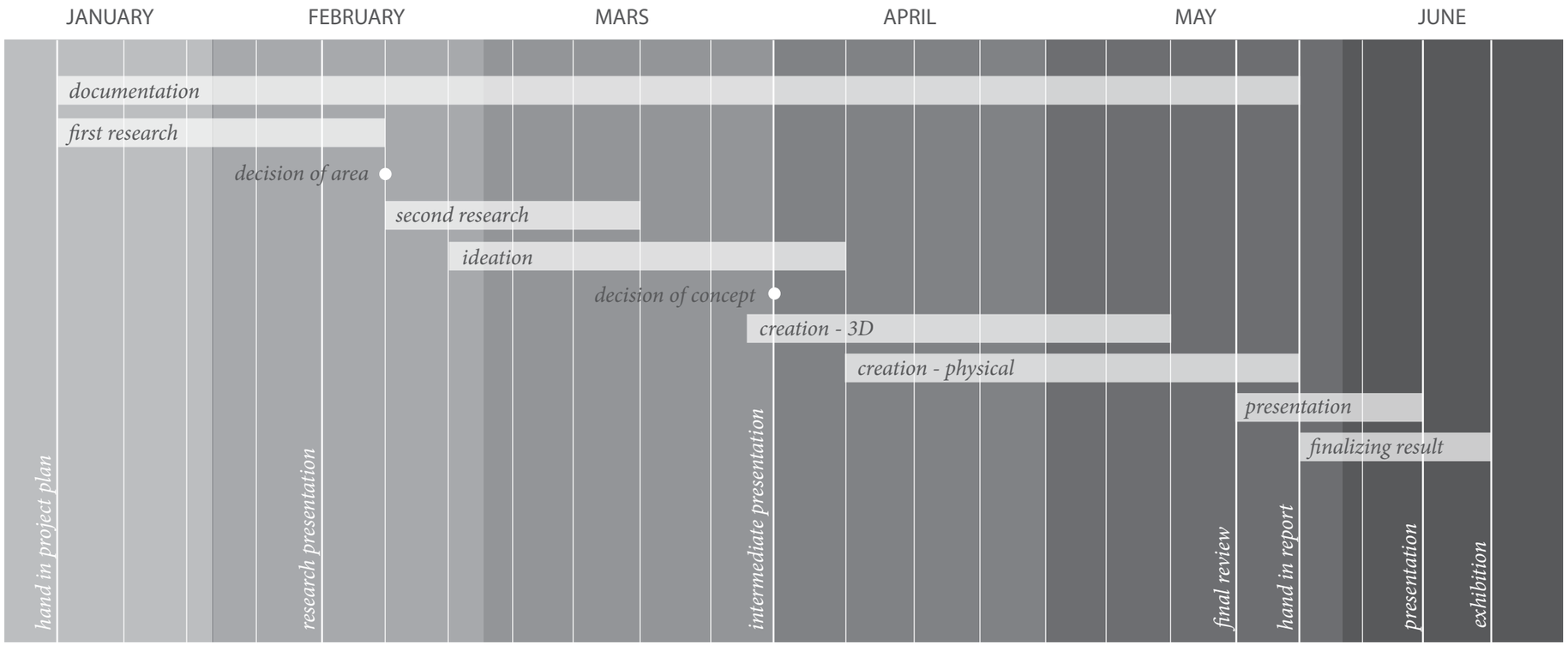
The interest of creating more sustainable agricultures has increased both among the producers and consumers. Ecological farming has become more popular just as the ecological produced food on the market. This trend could hopefully increase the chance for me to make a change within this field. This is the main reasons why the Swedish intensified agriculture is chosen as the problem area to focus on within this project.

METHOD

One of the essential parts within the master thesis is to manage a design project by your own. To be able to make the most out of the project it was important to plan the time. Therefor a time table was made. This is presented in the graphics below.

The project started with research that was divided into two phases. The first research phase where basic facts was covered to get a better understanding and increase the knowledge within the area. When having the basic facts a decision will be taken of what area to focus on for the next research phase. The second research phase involved field trips and interviews with people working within the area. This to increse the understanding for the issue. This phase created the foundation for the the ideation phase. The ideation phase was given more time because this phase, which involves idea generation, is one of my strongest skills as a designer. This phase was used as a tool to bring the project forward and direct it towards a desirable result.

When the ideation phase was finished one concept was decided to work forward with. The concept was then realised in the realisation phase where both a 3D and a physical model was produced. During the whole project a documentation was compiled where data was collected into a report. In the end of the project the final result was presented and exhibited.



INITIAL BRIEF

GOALS

The vision with the project is to find new ways of maintaining our biodiversity and increase the interest of doing that. This is a complex and time consuming task and therefor demarcations had to be setup.

DEMARCATIONS

The project is focusing on how to increase the chance of survival for the bird species living within the Swedish agricultural landscape.

METHOD

Research that involves field trip and interviews will be carried out to give the project an added value and a better connection to reality. The ideation phase of the project is essential and is therefor given more time.

OUTCOME

The end result will be a product that symbolize the project. This product will also work as a starting point for discussion around the issue.

Yellow Wagtail (motacilla flava)

RESEARCH [PART 1]

gathering basic facts to increase the level of knowledge

BIRDS

Birds are the most speciose class of tetrapod vertebrates in the world with its 10 000 living species. They inhabit ecosystems all around the world, from the Arctic to the Antarctic.

Birds range in size from the 5 centimetre small Hummingbird to the 2.75 meter big Ostrich. The fossil record indicates that birds evolved from theropod dinosaurs during the Jurassic period, around 160 million years ago.

Modern birds are characterised by feathers, a beak with no teeth, the laying of hard-shelled eggs, a high metabolic rate, a four-chambered heart, and a lightweight but strong skeleton. All living species of birds have wings and most of them can fly, with some exceptions such as the penguins. Birds have a unique digestive and respiratory systems that are adapted for flight. Some birds, such as corvids and parrots, are among the most intelligent animal species in the world and can manufacture and use tools.

Many species does long distance annual migrations, and many more perform shorter movements. Birds communicate by using visual signals and through calls and songs. They participate in social behaviours, such as cooperative breeding and hunting, flocking, and mobbing of predators. Eggs are usually laid in nests and incubated by the parents. Most birds have an extended period of parental care after hatching.

Many species are of economic importance, mostly as a food source both through hunting and farming. Some species, particularly songbirds and parrots, are popular pets. Another use is the guano (droppings) from sea birds that is harvested and used as a fertiliser.

Birds also figures frequently in human culture from religion to poetry to popular music.

120–130 species have become extinct since the 17th century as a result of human activity and hundreds more before then. Today 1 200 species are threatened with extinction by human activities, though efforts are underway to protect them.

On the picture to the right the anatomy of the birds are described.[5]

1. Beak
2. Forehead
3. Eye and rim
4. Lores
5. Chin
6. Throat
7. Auriculars
8. Crown
9. Nape
10. Back
11. Scapulars
12. Lesser coverts
13. Greater coverts
14. Secondaries
15. Primaries
16. Tail
17. Upper tail cover
18. Vent
19. Thigh
20. Tibia
21. Tarsus
22. Feet
23. Flanks
24. Belly
25. Breast

AGRICULTURAL HISTORY

The Swedish agriculture has changed drastically through history due to new innovations, agricultural policy decisions and consumer behaviours. Here are some of the most important changes gathered

TECHNICAL DEVELOPMENT

A vote in the ATL, a Swedish farming journal, showed that the most important innovation in agriculture during the 20 th century was the electrification. This developed into lighting, milking machines, mechanized manure and feed handling.

Another invention that has had enormous significance was the combustion engine. In the late 1940s the tractor was introduced to the Swedish agriculture, and eliminated the horses as colleague. Within a few decades much of the human work was also eliminated to create a more efficient farming. In the beginning of the 1800s 19 days of work was needed to harvest a tonne of grain. The same amount of grain was in the end of 1980s harvested in one working hour.

FARMING AS A PROFESSION

The increased mechanization and industrial expansion with its attractive salaries made people leave the agriculture. The family's own labour then became more important. Today, family labour stands for about 90 percent of the total agricultural labour. But times have changed. Today small farms provide full-time employment only when the business is highly specialized, such as milk production. The numbers of part-time farmers is therefor increasing.

Agriculture is still today a family business and statistics show that 79 percent of today's farmers have taken over the farm from close relatives. When the farms is transferred to the younger generation usually depends on when the state of agriculture is favourable.

The last major generational change occurred in the 1970s, when the profitability and investment was at its peak and the 1940s baby boomers were ready to take over the responsibility. Now the baby-boomers approaching retirement but is there a new generation that is willing to take over?

ECONOMICAL CHANGES

After World War II, it was considered important to secure a long term local food supply. The agricultural policy decision in 1947 that the state would hold up farm prices to give the farmers a decent income and that production would be slightly below the full self-sufficiency. The agriculture committees had the refusal when a property was sold and could in certain circumstances, expropriate the property.

In the agricultural policy decision in 1967 the focus on income faded. Rational and efficient companies wanted a more beneficial business and the retirement of older farmers accelerated. The pessimism in the industry was large and would not change until the 1970s, when the "green wave" entered. A new interest in developing countries and in our environment was awakened and made the public opinion more farmer friendly.

In 1977 a new agricultural policy decision was made. This time the new income target was in focus, while production and rationalization was toned down. To protect farmers incomes and at the same time meet the consumers demands for cheaper food a food subvention was introduced. Despite this the price of food increased and led to surpluses every year which cost the society large sums.

At the end of the 1980s the agricultural policy cost the state nearly 17 billion dollars a year despite the fact that the Swedish food prices were 60 percent above prices in the then EG. This lead to a new agricultural policy that would be guided by market prices and consumer demand. Deregulation, however, was short-lived. In 1995, Sweden became an EU member and the agriculture were once again regulated, this time in a European common agricultural policy.

THE ROLE OF THE CONSUMER

What we choose to eat affects the condition of agriculture. Just by start eating pasta instead of potatoes or require that the eggs are produced by free range hens the farming will change.

Today we also eat more than ever. The value of total food consumption doubled over the past fifty years, while the population increased by a third which also effect the business for our farmers.

Efficiency goal of agricultural policy has encouraged an increasing production. The introduction of artificial fertilizers and pesticides, has made it possible to increased the yields drastically.

During the first decades of spraying, before Rachel Carson published her book Silent Spring (1963) and environmental debate gained momentum, many farms suffered irreversible damages. In recent decades, the use of pesticide has declined. The proportion of active ingredient has been halved since the late 1980's.

The debate on animal husbandry has also been lively. Animal transportation and mad cow disease for example has caused many to completely opt out of meat. Consumer awareness has increased and more people are thinking about what they eat. Today, nontoxic and organic are important sales arguments.

A BUSINESS OF CHANGES

The agriculture in Sweden has been through many changes through history. New ground has been broken and other areas has became overgrown. Today the development is such that the pastures disappear and the open agricultural landscape becomes concentrated in the older agricultural districts. More and more, however, we realise that what may seem obvious in our landscape in fact is the result of generations of farming. [6] How the landscape will look like fifty years from now we do not know.

Today there are 72 000 farms in Sweden that employs 177 600 persons. This is 1,5 % of the total employments in Sweden.[7] Their work is of great importance for both us and our environment.

AGRICULTURAL DEVELOPMENT

The changes made to the agriculture landscape through history has effected the biodiversity. By changing the natural landscape many species has decreased within the area. Birds are one out of many species, living within the agricultural landscape, that has been negative effected.

The main reason for the changes made to the landscape is that the demands of products on the market is today higher while the farms are fewer. To fulfil the demands the Swedish farmers has been forced to create an intensified agriculture by make changes in the landscape. This is described in the graphics below.

A hundred years ago the agriculture was a small scale business. The farms grew smaller amounts of varying crops on their land. Some of the crops was sold to the industry while some was harvested for own use. The different crops created a varying landscape that supported the biodiversity and the agricultural birds. Today the farms are growing fewer types of crops and the landscape becomes homogenous. This creates less breeding and feeding areas for the birds which decreases in population.[8]

The machines used on the fields, where birds are breeding, are destroying nests and discourage the birds. The periods when these machines are most frequently used are interfering with important periods for the bird such as mating, breeding and migration.[9]

1900s

A decrease of cattle breeding has also influences the situation for the agricultural birds. The areas that were once used for cattle is today overgrown which makes it difficult for the birds to find insects.[10]

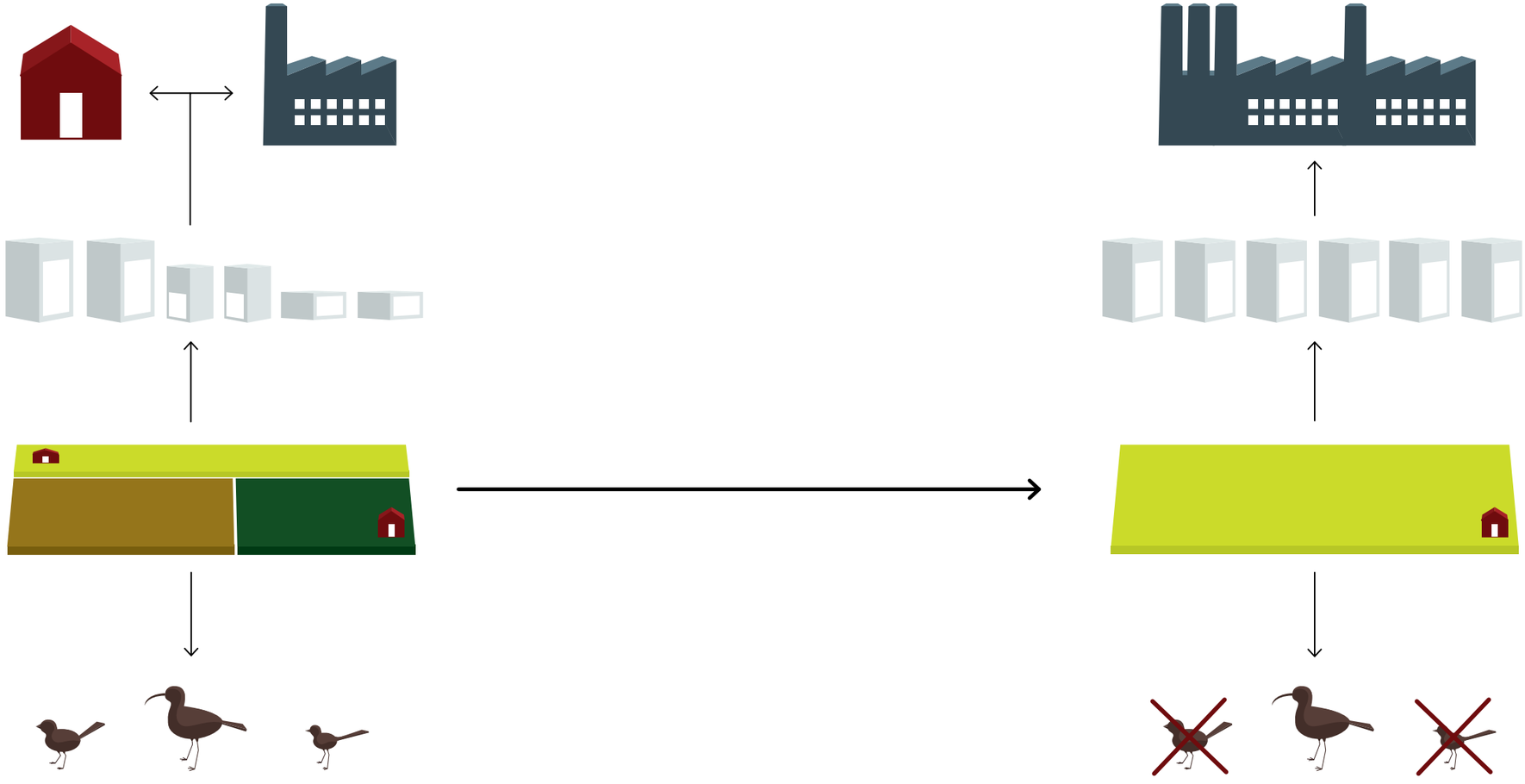
Important biotope such as cowsheds are removed in favour of a more efficient farming. These areas are important hibernation areas for the resident birds.[11]

When artificial fertilizers and pesticides was introduced on the market many bird species was critically harmed. Today the use of artificial fertilizers and pesticides has decreased but is still a problem.

Another threat is when farms are closing down and land, that previously was cultivated, is overgrown. This could lead to fragmentation, when species cant be spread across different environments. Many bird species actually benefit from a moderate usage of the land.

There are many factors effecting the birds in the agricultural landscape. There has been many improvement but there is still a long way to go. What is most important is that we today are better informed and aware of the situation and could therefor make changes.

2000s



THE RED LIST

The Red List is a list compiled by Artdatabanken where species that are likely to become extinct are collected. The different species are categorized into different fields depending on their risk of extinction. This is based on data from research, monitoring, museums, reports from amateurs and literature.

Here is the 2010 red list for the birds living in the agricultural landscape in Sweden. As you could see 27 birds is in total threatened, three is critically endangered and five is national extinct.

SCIENTIFIC NAME	SWEDISH NAME	CATEGORY	LANDSCAPE TYPE
Upupa epops	härfågel	Nationellt utdöd (RE)	J
Tyto alba	tornuggla	Akut hotad (CR)	J
Sylvia nisoria	höksångare	Sårbar (VU)	J
Pernis apivorus	bivråk	Sårbar (VU)	SJ
Perdix perdix	rapphöna	Nära hotad (NT)	J
Otis tarda	stortrapp	Nationellt utdöd (RE)	J
Numenius arquata	storspov	Sårbar (VU)	VJ
Limosa limosa	rödspov	Akut hotad (CR)	HVJ
Jynx torquilla	göktyta	Nära hotad (NT)	JS
Emberiza hortulana	ortolansparv	Sårbar (VU)	JS
Emberiza calandra	kornsparv	Starkt hotad (EN)	J
Dendrocopos medius	mellanspett	Nationellt utdöd (RE)	JS
Crex crex	kornknarr	Nära hotad (NT)	J
Coturnix coturnix	vaktel	Nära hotad (NT)	J
Coracias garrulus	blåkråka	Nationellt utdöd (RE)	J
Circus pygargus	ängshök	Starkt hotad (EN)	VJ
Ciconia ciconia	vit stork	Nationellt utdöd (RE)	VJ
Carpodacus erythrinus	rosenfink	Sårbar (VU)	VJ
Carduelis flavirostris	vinterhämpling	Starkt hotad (EN)	HFJ
Carduelis cannabina	hämpling	Sårbar (VU)	J
Asio flammeus	jorduggla	Nära hotad (NT°)	FVJ
Anthus campestris	fältpiplärka	Starkt hotad (EN)	HJ
Anser fabalis	sädgås (rastande)	Nära hotad (NT)	VJ
Anser fabalis	sädgås	Nära hotad (NT)	HVLJ
Anser erythropus	fjällgås	Akut hotad (CR)	FVLJ
Alauda arvensis	sånglärka	Nära hotad (NT)	J
Acrocephalus dumetorum	busksångare	Nära hotad (NT°)	VJ

Figure 1. Red listed birds in the farming landscape

NATIONAL EXTINCT


Hoopoe (upupa epops)


Great Bustard (otis tarda)


European Roller (coracias garrulus)


Middle Spotted Woodpecker (dendrocopos medius)


White Stork (ciconia ciconia)

CRITICALLY ENDANGERED

Barn Owl (tyto alba)

Black-Tailed Godwit (limosa limosa)

Lesser White-fronted Goose (a nser erythropus)

AGRICULTURAL TRENDS

The environmental issues of our actions is something we are informed about daily. This is a subject that engage many people all around the world and has therefor gain media attention. One of the areas where this is discussed frequently is within the agriculture.

To reduce the environmental issues created by the agriculture the concept of organic farming has emerge. To change existing farms into ecological farms has become popular, not only within Sweden but all over the world. This is one of the new agricultural trends.

The definition of an organic agriculture is said by IFOAM, the International Federation of Organic Agriculture Movements:

"Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved." [12]

Sweden has one of the highest percentage of organic farms in Europe. 7% of all farming areas are "KRAV märkt" and managed organically. The consumer demands and the market development are the determining factors for this development. But in Sweden the politicians also view organic farming as a way to achieve national environmental goals and a step towards a more sustainable development of the agriculture. Therefor political efforts to promote organic farming has been made with the help of objectives and development plans. This approach has developed the Swedish agriculture towards a more positive situation and is seen as a model in several countries.[13]

According to a scientific study from 2007, the organic farm would just give 10% lower yields then the conventional intensified agriculture. It even shows that it could give a greater harvest in countries with a tropical climate. A 22 year survey from 2005 shows that organic farming can produce just as much corn and soybeans as conventional farming. This is because an organic farm doesn't use synthetic fertilizers or pesticides. The humus content and soil is therefor strengthened and will grow better yields in the future.

The organic farming do also benefit the animal and plant life within the landscape. The number of species is greater, as well as the number of individuals of these species. A high biodiversity is something to strive for because it is a prerequisite for the agriculture. According to studies an organic agriculture has 30% more animals and plants than conventional farming.[14]

AGRICULTURAL COMPENSATION

In Sweden, farmers do the society a favour when nurturing and developing the agricultural landscape. Their work could help the state to achieve national environmental goals and therefore they could also get compensation for the environmental services they perform.

The farmers that grow and manage their land in a way that is beneficial for the environment could apply for an environmental support from Jordbruksverket. To obtain environmental payment, they must sign a commitment. A commitment is a contract where the farmers promise to manage their land and animals during five years under the rules of the compensation they are applying for.

There are different kinds of ordinance that a farmer are not allowed to break to be able to keep their economical compensation. One of these are the ordinance of protection of species which according to 4 § 1-2 says that the farmer are not allowed to catch or kill birds intentionally. It is also forbidden to intentionally disturb the birds during important periods such as mating, breeding, hibernation and migration.[15]

There are different types of environmental support that the farmers could apply for.

- Pasture and hay fields
- Cultural environments within the agricultural landscape
- Lay cultivation
- Organic production
- Isolation zones
- Wetlands
- Endangered breeds in animal husbandry
- Environmental protection measure
- Reduced nitrogen leaching

These compensation shows that the state are realizing the issues and are willing to make changes. It could also inspire and encourage the farmers to make changes to their business towards a more sustainable farming.[16]

European Robin (erithacus rubecula)

PROJECTS BENEFITING BIRDS

People have been fascinated by birds through history and is still today. The study of birds has even a own branch of zoology called ornithology. Ornithology differ from related disciplines in many ways. Most marked among these is the extent of studies done by amateurs working within the parameters of strict scientific methodology.

In Sweden there is a association called SOF, Sveriges Ornitologiska Förening. This is a national association for bird lovers, bird conservation and bird research. Members in this association support the work of the exploration and protection of the Swedish bird fauna but also international conservation.[17]

BIRD WATCHERS AND FARMERS

In 2007 a cooperation between SOF and Hushållningssällskapet started. A project to increase biodiversity in which farmers and birdwatchers together strive to encourage bird life in the agricultural landscape.

The project "Bird watchers and farmers together to increase biodiversity" includes 80 farms in Sweden. The farms are first inventoried on bird occurrence. Then farmers and bird watchers sit down together to draw up action plans for how to encourage bird life within the landscape.

An important tool that the project developed in 2008 was a fact sheet made for a number of common agricultural bird species (see appendix 1.1). These sheets includes facts and examples of improvement that can be done to the farm. With help of the fact sheet, participants in the project wants to encourage more farmers, and even bird watchers to join the project.

To secure the bird populations and other natural assets are interests that many farmers and birdwatchers share. By creating this collaboration, farmers and birdwatchers could share their knowledge and interest in how to create a sustainable agriculture. By creating an understanding and confidence between the parts the conditions for voluntary conservation efforts will also be better.

In the UK a similar project started in 1999 where 3800 farms have been inventoried on birds. The majority of these farmers have since then adopted conservation methods that has benefited many species of birds.[18]

BIODIVERSITY IN THE TABLELAND

In 2010 another project to increase the biodiversity within the agricultural landscape started. The project is called "Biodiversity in the tableland" and is a cooperation between LRF, Lantbrukarnas Riks Förbund and Jordbruksverket.

The project aims to increase the awareness of biodiversity within the agricultural landscape and to encourage more farmers to apply for environmental compensation that could benefit the biodiversity. The project is focusing on ecosystem services, such as pollination, hunting and other improvements that could benefit the farmers economically. An important part of the project has been to create a catalogue of simple, inexpensive conservation methods that favour the biological diversity and that could be applied directly to the farms. The target group is plain farms in southern and central Sweden.[19]

INDIVIDUAL EFFORTS

There are many civilians interested in birds and therefor are eager to help. Nesting boxes are installed to give the birds a breading place during spring and summer. Bird tables are filled with food to help the birds survive the cold winters. Bird baths are placed in the gardens to give the birds fresh water to drink and clean their feathers in. These efforts are done to increase the birds chance of survival but also for the pleasure of having them close to your home. It shows the interest we have in nature and that we are willing to make an effort to help its inhabitants.

THE BENEFITS OF BIRDS

BIRDS AS INDICATORS

All birds have their own ecological niche which makes them very sensitive for changes in their living environment. Bird species that are decreasing in numbers are a clear indication of that their natural environment is changing. They are also placed high in the food chain and can therefore be assumed to reflect the environmental status well.

They are relatively easy and well studied and therefor the ecological link between birds and their environments are better known than for many other organisms. The fact that many species also live close to the human population increases the awareness and understanding for these animals.

Historically, changes to the bird population has been the first warning signal of a environmental catastrophe. This was the case when the problem of mercury-treated seed and the DDT / PCB in the middle of the 1900s was detected.[20]

A more recent example is the famine in the Horn of Africa. The severe drought and famine affected millions of people in the area. A first sign of the catastrophe was seen by the birdwatchers in Sweden. In May, there was still no signs of the nightingales which usually arrives in Sweden at this time. Later it was discovered that the birds was also effected by the drought and couldn't fly at a normal rate which made them reach Sweden later then ordinary.[21]

These examples shows that the birds are important environmental indicators and therefor important to protect.

BIRDS AS CULLERS

Many birds are extremely important factors when it comes to limitation of pests. To be able to maintain their high body temperature, they must eat large quantities of insects. During a single day the parents could collect thousands of insects to their nestlings. To raise an entire clutch 30 kilograms of insects is used.

Many of our raptor species feed largely on small rodents and is an important factor in the regulating of rodent numbers.[22]

BIRDS AS AN INTEREST

Does birds actually have to be beneficial for us to help them? Isn't it enough that they sing for us in the spring, eat bread crumbs from the hands of our children and sits outside our windows during cold winter days?

Because birds lives in close connection to humans they have become one of few animals that almost everyone has a connection to. They are familiar but at the same time aliens with their ability to fly, that we so much envy. They have fascinated people through history like few other animals have. The interest for birds is important to encourage because it also involves discussions around other environmental issues.

Blue Tit (parus caeruleus)

RESEARCH [PART 2]

making inspiring field trips to increase understanding

FIELD TRIP TO ANNELÖV

The 18 of January a field trip was made to the farm of Bengt Hellerström in Annelöv. Bengt bought the farm in 1992 and has since then made small changes to the land towards a more ecological agriculture. He has a big interest in birds, hunting and insects. He is a certified agronomist but says that most of his knowledge he has gained during trial and error at the farm.

When talking to Bengt his genuine interest of creating an environment where he, together with plants and animals, could enjoy life shows. He has constantly new ideas of what that could be improved on the farm and is eager to try out new methods and techniques.

Inspiration for new improvements to try he often finds in magazines and on internet. As a member of Hushållnings Sällskapet, that gather farmers in the south of Sweden, he also get guidance and advices from specialists within the area. This guidance is something he uses frequently. Here the farmers could also spread information between each other.

Bengt has only applied for a few of the agricultural compensations there is. The reason why he hasn't applied for more compensations is because of the time consuming form that has to be filled out. Therefor he has chose to only apply for the compensations with higher amounts of economical support. Another issue is that he feel too obligated because he has to follow certain maintaining rules for five years and are not possible to make changes without loosing his compensation.

The results from Bengts efforts hasn't made any remarkable change economically. From the bees and other insects he supports he get a better pollination. The increased amount of bird species do remove some of the insects but mostly Bengt just enjoying having them around on the farm.

The interest of adapting the farming landscape to increase biodiversity has always been there. The interest of making improvements to maintain and increase the bird population came originally from a friend of Bengt who is an ornithologist. He told Bengt that there were few birds on his farm and gave him some tips on how to change that. Today the farm has more birds but it is still a work in process.

Bengts farm in Annelöv is part of the project "Biodiversity in the tableland" where the farm works as a "visningsgård" to inspire other farmers to make improvements to their land.

FIELD TRIP TO ANNELÖV

Annelöv gård is situated outside Lund and consists of 155 acres of cultivation with oil seed rape, sugar beet and cereals. To increase the biodiversity Bengt has done a couple of simple improvements.

1. On the farm there are three windmills. Around two of them, Bengt has planted shrubs and yellow melilot. This is plants that are very popular among pollinating insects. The area where the plants are placed is a spot that is left over between the crop land and a small hill and is therefor perfect to use.

2. Close to the windmills Bengt has also placed straw bales to create habitats for the bumblebees to increase pollination.

3. The old earth cellar in the garden is kept and adapted for bees to build their nests in.

4. The avenue with old willow trees are kept as a habitat for insects which also attracts many birds to the area. Around the willow trees the grass isn't cut to give the birds a hiding place when looking for food.

5. Close to the garden Bengt has planted lavender and here he has already seen an increased numbers of bird species and insects.

6. In the garden there are terracotta pots, placed up side down, in the soil to give the bumblebees a habitat

7. In the back yard Bengt has placed new trees since the others died from elm disease. This is done to create a better surrounding for birds and insect.

8. A bee battery is also placed in the back yard as a nesting box for hymenopteran. It took Bengt only a couple of weeks to get his first inhabitants.

9. In some of the trees there are bird nesting boxes are placed.

10. In the garden Bengt grow different types of fruit trees which increases the biodiversity on the farm.

During the autumn Bengt usually harrows four larch boxes. This becomes small areas on the field with less vegetation which facilitate birds when searching for insects to eat.

Bengt has also had a trial and a demonstration of flower-rich edge zones in which he counted the number of pollinators and other insects.

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FIELD TRIP TO NRM

The 22 of January a visit was made to Naturhistoriska riksmuseet in Stockholm. This is the biggest nature oriented museum in Sweden with everything from the north to south pole.

This visit was made both in research purpose but also due to personal interest. This museum gives you a chance to study animals in close up and there is plenty of information to take part of. A big part of the exhibition contained birds which was very inspiring for this project.

The most inspiring parts in the museum was; “diversity of life” and “nature in Sweden”. In these exhibitions different bird species and their ecological niche was described. Here you got the possibility to learn more about endangered and extinct species both in Sweden and in the rest of the world.

Here is a collection of inspiring pictures from the museum. With increased knowledge and inspiration the project was continued.

FIELD TRIP TO VANSÖ

The 24 of January a third field trip was carried oute together with Petter Haldén to a farm in Vansö for a consultancy meeting with Börje Waldebring. The farm in Vansö is part of the project “Bird watchers and farmers together to increase biodiversity”.

Petter Haldén is an agronomist and has worked since 2008 as a conservation adviser based in Uppsala. His clients are mainly county administrative board and Jordbruksverket and he is today working nationwide.

- To discover new environmental benefits, improving existing ones and provide as much biodiversity as possible for money is what concerns me most. To meet with farmers and help them improve their land for birds and pollinators are also very inspiring. I am part of the major project “Birdwatchers and Farmers in Cooperation” where we meet 80 farmers annually for individual consulting of birds in the farming landscape. I hope that we, with this project, will inspire more farmers to make an efforts to improve the conditions for pollinators and birds on the plains. Besides that it is fun and pretty, you could also get cash back, says Petter.

Börje Waldebring that is the farmer in Vansö owns 250 acres of cultivation. Winter wheat is the main crop but there are also rape, flax, pasture, malt barley and oat on the farm. Börje is a hunting and predator expert in LRF and has a big interest in wildlife conservation. Because of that he has begun with a numbers of wildlife and bird fields placed on parts of the former pasture. By not applying for agricultural compensation he can manage the fields as he please. He can try out different methods to find the most suitable for him and the wildlife on the farm.

Of the 29 farm-related bird species in Sweden 14 has been observed on the farm in Vansö and three of them are placed on the national red list. These three species are skylark, wheatear and shrike (see appendix 1.2).

This visit was made to follow up the improvements Börje has done to the farm and to find new ways to support the biodiversity in the area. The visit was made together with Ture Persson, an ornithologist that has been inventorying the fields.

FIELD TRIP TO VANSÖ

The visit started with a car ride through the farming landscape to look at the improvements done, how it had developed and what that could be changed. After this a discussion took place between Börje, Petter and Tore.

The improvements done, since Petter visited the farm last time, had been quite successful. To improve it further even new suggestions was presented for Börje.

Börje wanted to focus on how to give the birds shelter on his farm because he is already able to provide them with food when giving them left over grains from the harvest.

The first suggestion was to plant a “bird field” were grain is left unharvested and arable land unploughed throughout the year to provide the birds with shelter and food.

The second suggestion was to make skylark plots and the third was to start growing chicory to create protective areas for the pheasants and the partridges. Many more interesting suggestions was presented but these were the ones best suited for the farm. Börje was very pleased with the information and inspiration he got from the consultancy.

When driving from the farm together with Petter we got the possibility to discuss the concept of consultancy further. When attending on these meetings, together with the farmers, Petter has felt that there are a genuine interest of making improvements to help the birds. Not because of economical benefits but as an interest and the pleasure of having them around the farm.

He also described that their work is important even if the interest for birds is weak. Then their goal is to work as a source of inspiration by presenting ongoing or previous successful work. The farmers could also inspire each other. Petter has seen examples of farmers creating their own inventions to help the birds which encourage other farmers.

Petter, and the other people involved within this project, try to customize the suggestions to each farmer according to his/her interest. That will increases the chances of getting the improvements executed.

Many of the improvements that Petter are suggesting to the Swedish farmers are methods used in other countries in Europe. Successful inventions from other farmers are also developed and applied on other farms.

Swedish ornithologists together with agronomists do also create new solutions to help the threatened birds. Which species to focus on varies depending on status but it is beneficial to concentrate on one species at a time when creating improvements because of their individual ecological niche.

RESEARCH [PART 3]

making conclusion and analysing the research

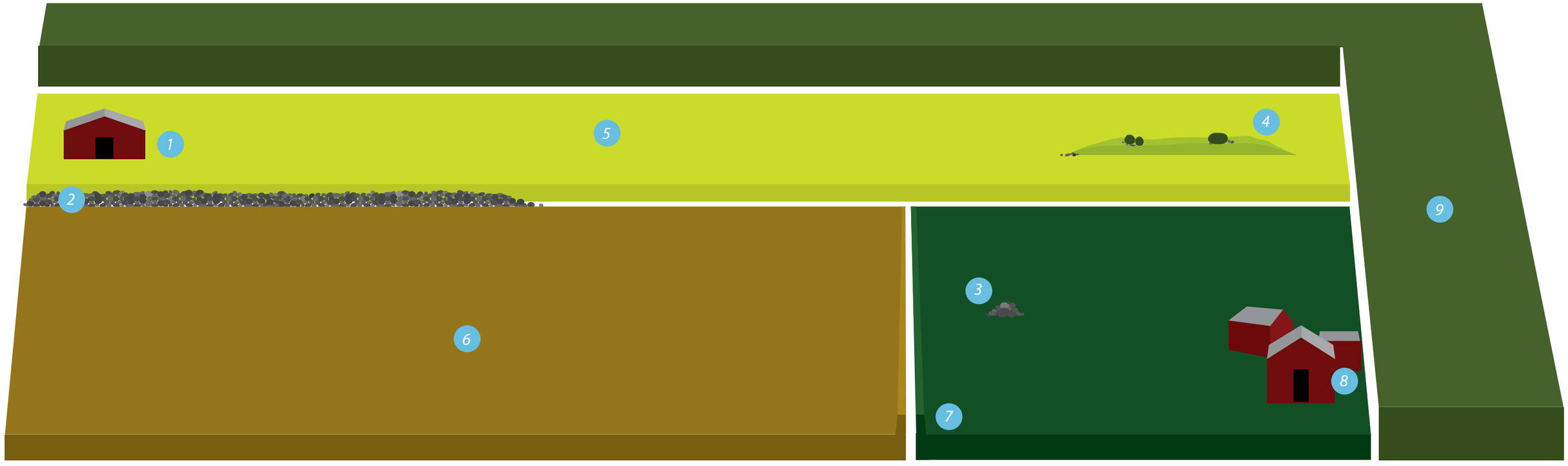
CLIMATES ON A FARM

The agriculture landscape could provide different climates depending on the geographical location and what is farmed in the area. Different climates will attract different species. Therefor, a farm with a varying climate will also have an increased biodiversity. Some of the climates existing within the Swedish agriculture, which also are the areas most popular among the farming birds, is gathered in the graphic below.

1. Small biotope, cowshed
2. Small biotope, stone mure
3. Small biotope, cairn
4. Small biotope, field islet
5. Pasture or meadow
6. Farming land
7. Edge zone
8. Habitation
9. Forest

Shown in the graphic is that small biotope, in varying shape, are common elements on a farm. What is interesting with these areas is that they provide different climates within a small area which increases the biodiversity even more. They are sculptural and characteristic elements placed around the landscape. In the intensified agriculture the small biotope are unfortunately removed because they are creating farming obstacles.

Could a new types of biotope be integrated into the landscape again and fulfil the demands from both nature and farmers?



NECESSITIES ON A FARM

From the research done it showed that there were three main necessity for birds living within the farming landscape. That was food, shelter and habitat.

The majority of the agricultural birds feed on insects such as flies, mosquitos, butterflies, beetles and spiders. These could be caught both on the ground and in the air by the birds. Seeds from plants such as the sunflower are popular among the seed eating birds. The raptor birds hunts smaller mammals such as mouses and voles.

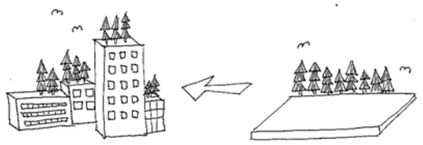
To reduce the risk of getting caught by predators the birds are depending on shelters. This is usually found in different vegetation on the farm. The possibility to hide in the vegetation makes it also into a suitable area for the birds to build their nests.

The main goal for birds is to save energy due to the high amount needed when flying. Therefor it is important that all these necessities are provided within a limited area. Unfortunately this is not the case in the intensified agriculture. Due to the homogenous landscape food, shelter and areas to build nests are decreasing. To fulfil their needs the birds are forced to fly long distances which reduces their chance of survival. This was something to consider when continuing the project.

FIRST IDEAS

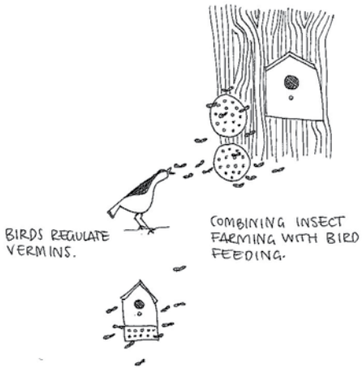
To take the project to the next level first ideas was scribbled down with inspiration from the research and field trips. To discuss the ideas knowledgeable persons within the different fields was contacted.

Through this a contact was established with David Ståhlberg, who runs a project called “Vindkraft i slättlandskapet” where rest areas around windmills are used to increase the biodiversity. Just like in the marked scribble.



MOVE THE BIRDS TO OTHER AREAS BY CREATING HABITAT & SUITABLE ENVIRONMENTS.

BUTTERFLY FARM TO FEED BIRDS AND TO POLLINATE.



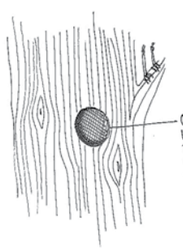
BIRDS REGULATE VERMINS.

COMBINING INSECT FARMING WITH BIRD FEEDING.

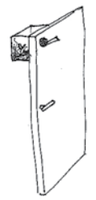
CREATE BIRD FIELDS WITH SUITABLE MIX OF PLANTS.
USE UNUSED AREAS ?

CREATE A SEEDMIX WITH SUITABLE PLANTS TO GET A MIXED VEGETATION FOR BIRDS. EASY TO PLANT.

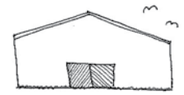
MARK THE BREEDING AREA ON THE FIELDS.



COLORING THE NEST HOLES TO MAKE THEM VISIBLE AND PREVENT THE TREES TO BE CUT DOWN.



BIRD NESTS INDOORS TO STUDY/CREATE INTEREST.



FIND WAYS TO USE OLD SHEDS TO PREVENT THEM FROM BEING REMOVED.

CREATE MIGRATORY STOP IN GARDEN.

GET THE BIRDS CLOSER TO INCREASE INTEREST AND UNDERSTANDING.

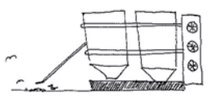
CREATE DOORWAYS FOR BIRDS IN SHEDS.

BIRDS COULD HELP THE FARMERS SPREADING SEADS.

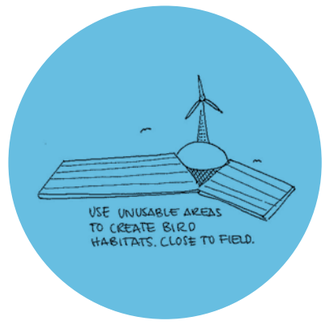
CREATE TOURISM AROUND RARE BIRDS TO INCREASE UNDERSTANDING AND GET MONEY TO MAKE A BETTER HABITAT FOR THEM.

CREATE A REHABILITATION IN THE GARDEN WITH FRUIT TREES AND SHRUBS FOR BIRDS.

FACILITATE FOR ORNITHOLOGISTS.

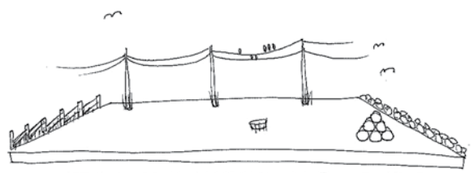


USE GRAINS FROM THE HARVEST TO FEED THE BIRDS.



USE UNUSABLE AREAS TO CREATE BIRD HABITATS. CLOSE TO FIELD.

USE LEFTOVERS FROM QUARRYING INDUSTRIES TO CREATE NEW CAIRNS.



USE ALREDY EXISTING MATERIAL ON THE FIELD FOR FEEDING AREA AND HABITATION.

A kreotp integrated into the intensified agricultural landscape

"VINDKRAFT I SLÄTTLANDSKAPET"

The windmills placed in the farming landscape will increase in the near future. When installing a windmill the landscape will change. Except the mills there will be roads, hardstands and electrical cabinets. Around these new elements rises rest areas less suitable for cultivation. The rest areas are perfect places to use for increasing the biodiversity.

KREOTOP

In Sweden there is a new and unique project called "Vindkraft i slättlandskapet" that started in 2010 and runs by Jordbruksverket. The project aim is to taken advantages of the rest areas appearing when installing windmills in the agricultural landscape. By creating habitats, known as "kreotopes", at these areas the biological diversity will be supported. With small resources such as planting flowering shrubs, dig ponds and utilize sand and dead wood this areas could develop into habitats for wild flowers and pollinating insects. By increasing the biodiversity the bird species will also be supported.

The expansion of wind power will create more than 600 acres of potential conservation areas in the southern and central Swedish until 2020. The surfaces can be scattered within a radius of several hundred meters around the mills.

THE PROCESS

A kreotop is developed through a process. This process could vary depending on the conditions but will always follow a set structure. First the natural values of the area are mapped, such as the natural habitats, species found in the area and their requirements. It is also important to note the presence of risk species like threatened birds and insects.

Then an ideation phase starts which results in concrete suggestions of kreotopes suitable for the area. These suggestions could derive from either the farm owner, a representative for the wind power company or a compound. These proposals then have to be adapted to local conditions and anchored by the district. After the adjustments, the proposal could be implemented and the responsibility for maintenance could be decided. Because this is a new project it isn't possible to get economical support for creating a kreotop yet. But the possibility is today researched.

THE WINNERS

There are multiple winners within this concept. The wind power companies biggest profits is to participate in a project that could convey a positive image of the business. It will show that they are also taking into account the natural environment and the people living in the areas where renewable energy is produced. To demonstrate the will to implement conservation measures, such as kreotopes, can also facilitate a dialogue with the licensing authority. That bridges are built between wind power companies and government agencies is something that is positive also for the authority. Then misunderstandings between the parties could be reduced. In the long term kreotopes will also help to meet environmental goals which the authorities are interested in. For example, the goal of a rich agricultural landscape and the conservation of plant and animal life.

The landowners often gain financially when installing wind turbines on their farm. Sometimes they are even the ones initiating the establishment. They could get revenue for maintenance work that is needed and will also get the natural values of the area mapped. Ecosystem services like pollination, recreation, hunting and pest control are also benefits they could gain.

Neighbours are sometimes affected by the changes made to the landscape when establishing wind mills. If landowners or wind power owners are making an effort to create recreational areas, that will be positive for the area, a better atmosphere within the district could be gained. Local residents will also indirect benefits form the increased biodiversity. Kreotopes could also provide aesthetic values in the landscape and create recreation opportunities such bird watching or horseback riding along the newly laid gravel roads.[23]

PROBLEMS TO SOLVE

By contacting David Ståhlberg, a biologist at Jordbruksverket who runs the project, a couple of problem areas was point out. Because the project is quite new there are still improvements to do. Most important is to motivate the land owners to make the effort. There is a need for engagement when establishing a kreotop. Time and money is required to create a functional kreotop. A process that is simpler, cheaper and less time consuming could increase the motivation.

Another problem is that the new generation of farmers like a clean look at their farm. A kreotop made out of a pile of sand and old wood doesn't suit them.

The communication of the concept is today vague. Passersby would have a hard time to understand the function and the positive effects of a kreotop just by looking at it.

Because of the potentials of this concept and its need for improvement a decision was taken to continuing the master project within this field.

REST AREAS ON A FARM

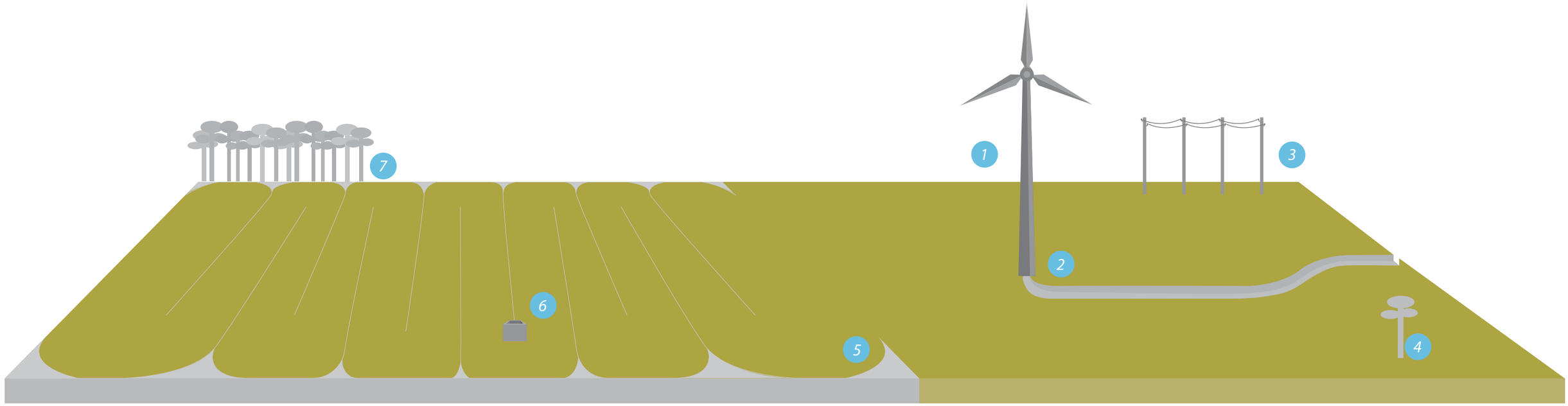
One of the interesting things with a kreotop is that it uses areas which the farmers can't cultivate.

To find new possibilities for the concept Swedish farmers was contacted. They could confirm that there are more rest areas on a farm then the ones occurring when establishing a wind mill.

The rest areas could be areas less suitable for growing crops such as shady forest edges. It could also be areas difficult to reach with the farming machines such as around field wells, electricity pylons or field corners. These areas does therefor hold an untouched nature.

These areas was therefor optimal to use within this project because the risk of creating a new farming obstacle will be minimized. Here are the most common rest areas in the Swedish agricultural landscape that also could be suitable to use.

1. Wind mill
2. Roads
3. Electricity pylons
4. Single trees
5. Field corners
6. Field wells
7. Forest edges

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MEETINGS IN NATURE

What was realized when researching rest areas in the agricultural landscape was that they all have one thing in common. All these places are meetings. Meetings between climate, meetings between height and meetings between materials.

Meetings in nature is something that attracts species all over the world. These contrasts creates a special type of biodiversity. Here are some examples.

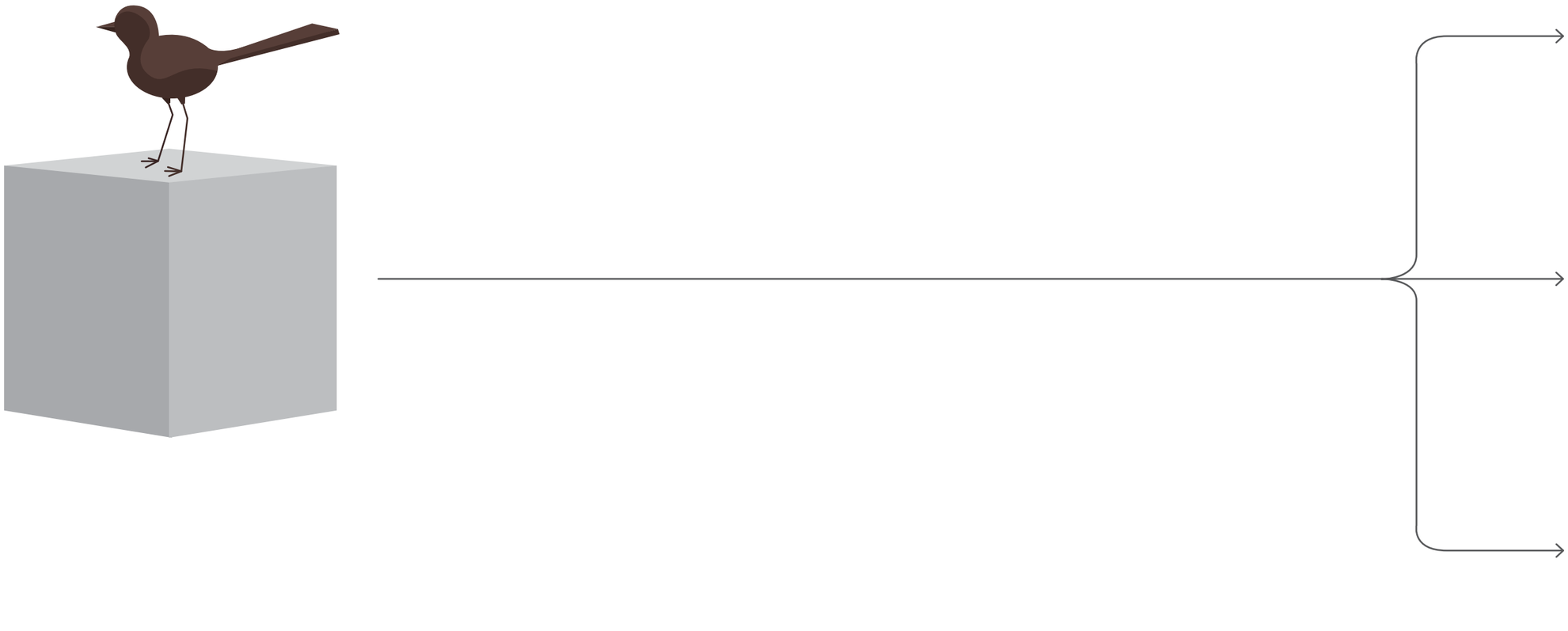
1. Meetings in material where different type of vegetation interact. 2. Meetings in structures where the coral reef is a perfect example that could gather thousands of species. 3. Meetings in height which creates important view point

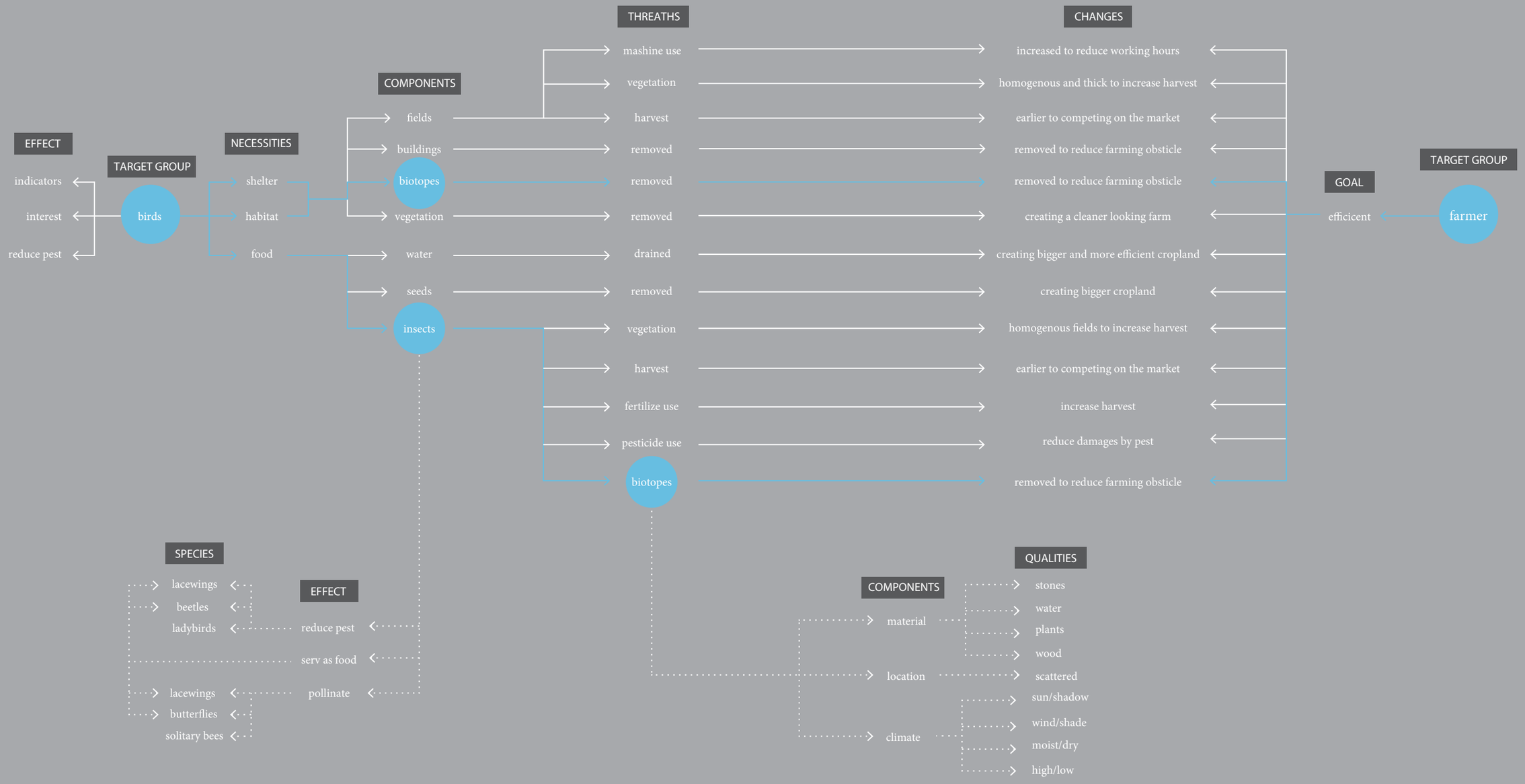
4. Meetings in elements such as the watering holes. 5. Meetings in temperature with shadow and sun. This was something to consider when continuing the project.

TARGET GROUP

To better understand for whom to design the target group had to be defined. If this is defined it will be easier to set guidelines for the product development. In this case the Swedish agricultural birds was the users of the “product”.

There are different possible buyers to this solution. Either the farmers buy, install and maintain the product themselves to increase the biodiversity on their farm. Different organizations such as Naturvårdsverket, Jordbruksverket and WWF could also be responsible for buying, installing and maintaining the product. Another scenario is that the Municipality would invest in the solution to reach the national environmental goals. There is also the possibility of a cooperation between the parts. The common factors among the possible buyers are their interest in a functional, sustainable and inexpensive solution that could solve the problem.





RESEARCH SUMMERY

To understand the complex task taken on within this project a very widespread research had to be done. The facts had been turned into a basic knowledge about the problem while the field trips had increased the understanding for it. All knowledge and understanding gained during this process had a connection to each other which could be difficult to see. Therefor a map of the most important research was done and is shown in the graphic above. This showed that four parts was more vital and closely linked together. These parts was birds, farmers, biotope and insects and was therefor chosen to work forward with.

The threatened existence of the swedish farming birds was the starting point of this project and therefor an obvious first choice. The reasons why the birds are decreasing in numbers is closely linked to the changes made by farmers to intensify the agriculture. Therefor the farmers was the second choice. One of the most common changes made to a farm is to remove the small biotope. These areas are important oasis for the farming birds. Therefor this was the third choice. The removal of biotope does not only threaten birds but also insects which is an important factor in the survival of the birds. Insects are the main food source for the farming birds and by pollinating plants they also provide the birds with fruit, berried and seeds. Therefor insects was the forth choice.

These four parts are chosen as the foundation for the ideation phase

REFINED BRIEF

The goal with the project is to create a biotope, in the Swedish intensified agriculture landscape, that could support the farming birds with some of their necessities.

The location for the biotope should be carefully chosen to not create another farming obstacle and to fulfil the climate demands.

The biotope should be planned to simplify installation, the need for maintenance and reduce cost.

The system should communicate that an arrangements is done to increase the interest and engagement.

Whinchat (saxicola rubetra)

IDEATION

turning gained knowledge into concepts

THE OPTIMAL BIOTOPE

To find what elements and qualities to integrate into the new biotope an natural biotope, optimal for birds and insects, had to be researched. As mentioned before all bird has their own environmental niche and therefor it is difficult to create a biotope that all farming birds would enjoy. But studies has shown that there are some natural elements that are more popular among the agricultural birds and insects such as water, stones and vegetation.

WATER

1. Many watercourse in the landscape are today drained and they are important for the survival of birds and insects. Therefor a water source should be integrated into the new biotope.

STONES

2. Stones in a biotope is a perfect place for birds to find food. Due to the stones ability to store heat the insects gather here to rise their body temperature.

VEGETATION

3. Tree and bushes are popular among both birds and insects. In the crowns birds could find shelter from predators and also build their nests. The stems are often used as habitat for insects. Typical bushes and trees that are popular is: hazel tree, elder tree, bramble, snow berry and currant. Their fruits and berries could provide the birds with food and their nectars will attract insects.

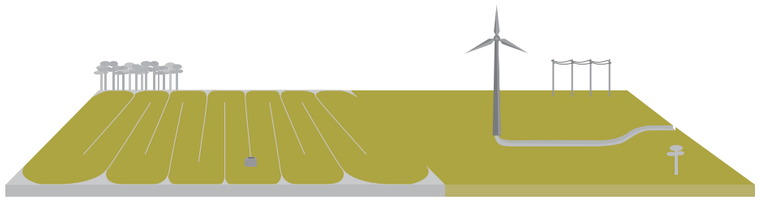
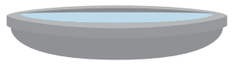
4. Plants that provide the seed eating birds with food are: sunflower, rape, white mustard, oat and flax. Common plants that attract insects with their nectars are: lavender, poppy, dill, yarrow and melilot.

5. The placement of a biotope is usually connected to the croplands where many species are breeding.

QUALITIES

6. A natural biotope could provide a wide range of climates within a small area and therefor attract many different species. It gives its visitors a possibility to find spots that are sunny, in shadow, moist, dry, windy and shaded. Due to the different vegetation it is also varying in height.

A new biotope with these elements and the qualities of a natural biotope could become important areas for threatened birds and insects.


GUIDELINES FOR THE NEW BIOTOPE

The importance of the small biotope within the agricultural landscape is clear. A natural biotope is a complex system developed during years and there are many things to consider when trying to create a new one.

PLACEMENT

The reason for the removal of these areas are that they creates obstacles when farming. To be able to integrate a new biotope it is therefor important to consider the placement. By using rest areas in the landscape this problem could be prevented.

The placement of the rest areas have other positive effect to the new biotope. These areas are usually untouched by the farmers and does therefor host weed and other types of plants that attracts insects and birds. The rest areas are also connected to the cropland which gives birds the vicinity to the fields where many species build their nests.

ELEMENTS

In a new biotope there are different ways of creating water sources but there are also regulations which has to be considered. If a pond is created it could be registered as wetland and due to regulations the areas would become an isolation zone. This is something few farmers would risk because it will force them to follow specific rules when it comes to maintenance and they will loose the control of the area. To prevent this from happen the water has to be stored in a container that are possible to move.

Beside the stones possibility to store heat there are also negative effects that should be reduced when creating a new biotope. The stones usually covers a big area on the ground which creates a obstacle when farming. They could be difficult to handle due to their size and weight which could create problems if the farm has to be restructured. The aesthetics of having a stone pile on the farm also seems to bother the farmers which like their farms to look tidy.

The vegetation in a natural biotope consists of two parts; trees and bushes, plants with nectars and seeds.

Trees and bushes provides birds and insects with habitat, shelter and food. This kind of vegetation is positive to integrate in a new biotope because of the low need for maintenance. The negative effect of this type of vegetation is that it, just as the stones, cover a big area and could be problematic to move.

Plants with nectars and seeds provide birds and insects with food but are seldom planted by farmers because of the possible side effects involved. To find suitable plants that will thrive on the farm could be difficult. The best way to success is to find plants already existing in the areas, dry the seeds and then plant them. This is a time consuming method that rarely farmers use. If the plants don't suit the farm the maintenance will also be higher. Another side effect is that the spreading of the plants could be difficult to control and could easily starts to compete with the crops (see appendix 1.3).

These possible side effect does also apply when planting new trees and bushes. Due to the high risks involved when sawing new plants less focus is put into this area when creating a new biotope.

FOCUS

To continuing the ideation phase a few guidelines was set. The placement of the new biotope will be at the rest areas. Due to their limitation in size it is important to keep the new biotope small. If water is integrated into the new biotope it has to be stored in a container. Stones has to cover less ground space and be able to move. Because the integration of vegetation is not in focus new ways of providing insects with habitat and both insects and birds with food has to be found. The new biotope has to look intended and tidy. If possible the quality from a natural biotope will be kept where different climate are gathered into a small area.

Great Spotted Woodpecker (dendrocopos major)

INSPIRATION

This is a picture of a wood pecker eating insects from an insect hotel. This picture together with the engagement Bengt showed when presenting his bibatteri at Annelöv gård was the inspiration to the first concepts. Could an insect hotel be a substitute for old tree stems in a new biotope?

INSECT HOTEL

An insect hotel is a man made structure created from natural materials. The hotels can vary in shapes and sizes depending on what type of insects that is intended to attract. The natural materials in the hotel provide different types of insects with nesting facilities, especially during the cold winters.

PURPOSE

An insect hotel could have many different guests. Most commonly rooms for solitary bees and wasps is provided because they are helpful pollinators in the garden. Other useful guests are butterflies, ladybirds, spiders and lacewings. In some hotels insects creates a nest to where they drag prey and deposit their eggs. Other hotels are designed with the purpose to allow the insects to hibernate. Insect hotels are usually placed in gardens close to flowers, fruit or vegetable to encouraging insect pollination.

BUILDING A HOTEL

Different material attracts different insect species. Common is to use rest material such as old news papers, broken terracotta pots, old tiles and wooden pallets. Creating holes in a materials will encourage the insects to place their larvae there. Therefore materials, such as logs, bark, bound reeds or bamboo are often used. By variegating the sizes of the holes you will attract different species. Some species even like to furnish their holes with clay, stone and sand. This makes it easy to see if a hole is occupied.

The best location for a hotel is a warm and sheltered spot, such as a southern-facing wall or hedge. The first insects are already active towards the end of winter and will then be searching for such a place to settle.

Not only pollinating could be increased with insect hotels. The hotels will also attract predatory insects which help to control unwanted bugs. Earwigs and ladybirds for example eat plant lice while isopod work as scavengers in the garden.[24]

BEING PART OF A BIOTOPE

When a biotope is removed the natural habitat for insects, disappears. These hotels could be a substitute when creating a new biotope. The insects will in turn provide birds with food and the farmer with ecosystem services such as pollination and pests control. Solitary bees, beetles and butterflies are suitable insects to attract on a farm for pollination while lacewings and lady birds could be used for pest control.

SWOT ANALYSIS

The insect hotel is interesting because of its beauty, functionality and simplicity. In this product there are many possibilities but also difficulties that had to be considered.

POSSIBILITIES

The positive effect of integrating this product into the agriculture landscape is that it could support insects with new habitat. Depending on placements and construction different useful insects could be attracted to the area such as pollinators and pest controllers. Some of these insects such as butterflies, beetles, spiders and beetles are also common food for birds. By using an insect hotel the insects will be gathered in a smaller area which could help the birds to save energy when collecting food.

By using natural materials and preferable also reused material it is possible to create a sustainable product. The construction of the hotel could be used to create a sculptural elements within the landscape which could stand out and increase interest.

The process and effect of an insect hotel could be visualized which hopefully could increase the engagement. The process could be divided into three steps. First the installation of the habitat is done. Next step will be to see if any insects are attracted and becomes residents. The last step will be to see if more birds getting attracted to the area. If these steps occur you will know that the hotel is functioning.

DIFFICULTIES

The insect hotels are today adapted for garden use. The farming landscape has another kind of climate with more wind and less shady spots. This means that the hotels has to be adapted to this climate to be able to work properly.

It is also important to consider the materials and construction of the hotel to attract the right types of insects. These choices will also effect the production costs and the need for maintenance.

The placement is important to minimize the risk of becoming an farming obstacle.

VISITING AN INSECT HOTEL

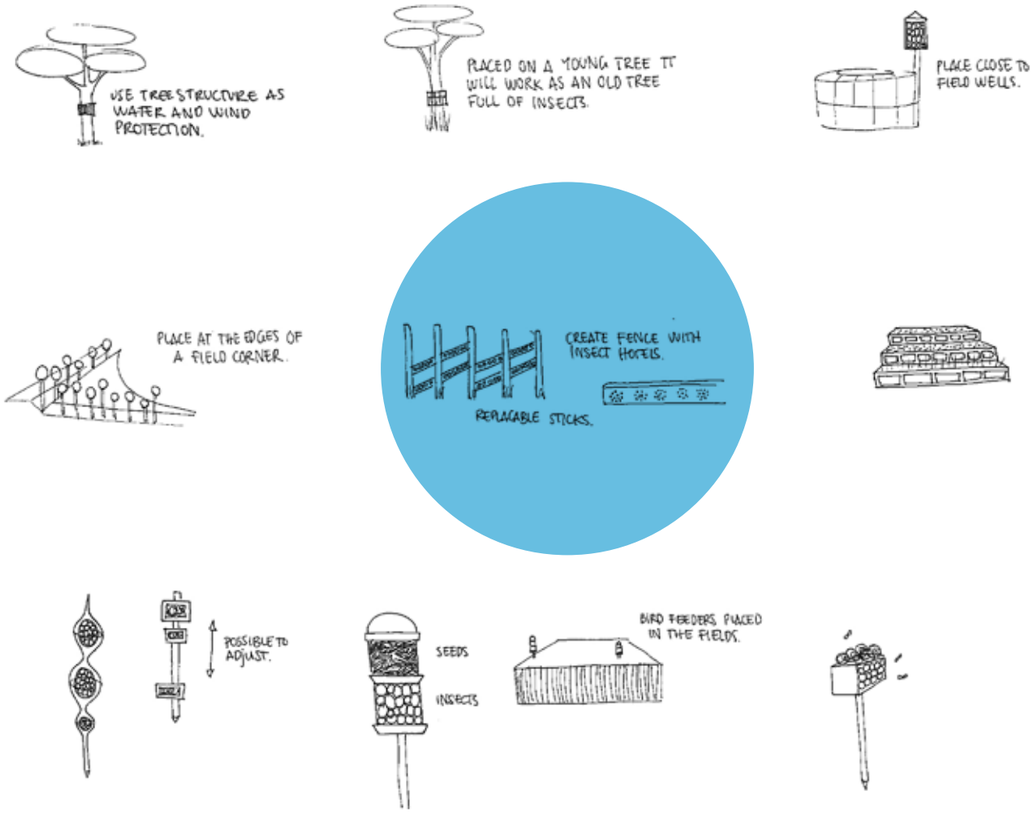
To have a closer look at a public insect hotel a visit to Rosendals trädgårdar in Stockholm was made. This hotel, together with another one, had been placed into the garden six months earlier.

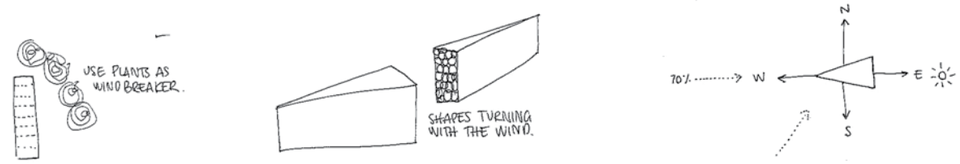
From the look of it you could see the poor construction which has resulted in a need for maintenance. The other hotel had to be removed due to vandalization.

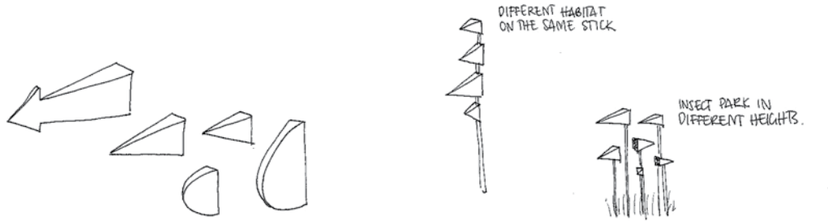
From this visit it was clear that the construction and material choice was important to consider when building a hotel that should stand the outdoor climate. If the right material and construction is used the maintenance could also be minimized.

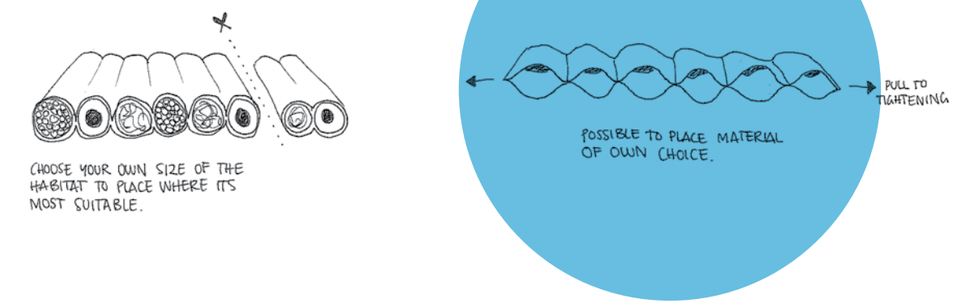
CONCEPT SKETCHES

After evaluating the different concepts made for insect hotels the two most interesting ideas was chosen to developed further. the first concept marked, where an insect hotel was integrated into an existing structure, was chosen because of the innovative way of implementation. The secon concept marked, where natural material from th farm could be placed into a designed structur was the chosen because of its cost efficiency.









Rook (corvus frugilegus)

INSPIRATION

This picture, where different species are gathering at the same watering hole, was the inspiration for the second concept. Is it possible to find a way to provide watering holes for birds and insects in the agricultural landscape?

THE IMPORTANCE OF WATER

Birds and insects are, just like us, depending on water. Fresh is essential for all species.

FUNCTION

Birds does not sweat like other mammals but they still looses water through their respiration and droppings which they have to refill. Most small birds need to drink at least twice a day to replace the lost water. To have water to bath in is just as important. It is essential for them to keep their feathers in good condition where bathing is an important part of the feather maintenance. By dampening the feathers dirt is removed which makes them easier to preen. When preening, birds carefully rearranges the feathers and spreads oil from the preen gland so they remain waterproof and trap an insulating layer of air underneath to keep them warm.

Water is also essential for the reproduction of many insects such as mosquitos, which are one of the most common food supply for the farming birds.

BIRD BATHS

Bird baths are commonly placed in gardens and are a man made solution to the lack of fresh water for birds. It is important that the baths are shallow, to prevent the birds from drowning. You also have to consider the placement of the baths. There should be plants or bushes close by that could work as shelter for the birds, but it shouldn't be to hidden because that will facilitate for cats to catch the birds.[25]

Birds need water all year round and especially during the cold winters when unfrozen water could be hard to find. It is also very important when providing birds with water that it is clean.

BEING PART OF A BIOTOPE

When a small biotope are removed, wetlands are drained which is essential for both birds and insects. Providing them with a new water source could become the different between life and death.

Willow Tit (poecile montanus)

SWOT ANALYSIS

The most common way to provide fresh water for the birds is by placing a birth bath in the garden. To find possibilities and weaknesses a swot analysis was made.

POSSIBILITIES

The positive sides of a bird bath, if integrated into the agriculture landscape, is that it will support the agricultural animals with a source of fresh water. This will not only increase the chance of survival for the birds but also the insect which is the main food source for the birds. The insects will also provide the farm with ecosystem services.

By using rainwater the bird bath could be self sufficient and possibly reduce the maintenance. Just like the insect hotel it is possibility to create a sculptural elements in the environment that could stand out and create interest.

To find fresh water during the Swedish winters, for the resident birds, could be difficult. A possibility could be to create a bird bath that prevent the water from freezing.

DIFFICULTIES

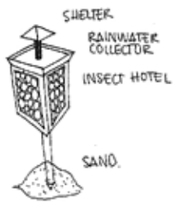
The bird baths has to be installed and maintained to prevent bacteria and other diseases from spreading.

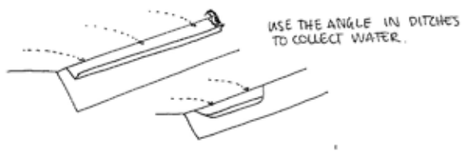
There is a risk, when creating a water source, to create a isolation zone which the farmers want to prevent. It is therefor important to consider these regulation. The depth of the container is also important to consider to prevent birds and insects from drowning.

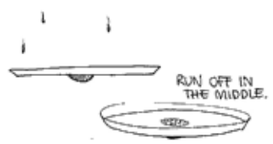
When placing the bird bath on a farm it is important that it will not become a farming obstacle and to find an area that are safe from predators.

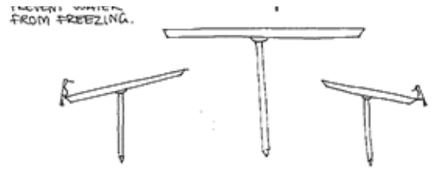
CONCEPT SKETCHES

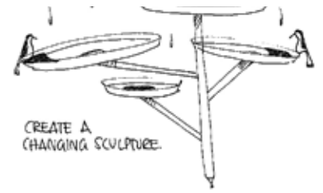
After evaluating the different concepts made for bird baths the most interesting idea was chosen to developed further. The marked concept, where a rainwater collector and an insect hotel was combined, was chosen because of its space efficiency.

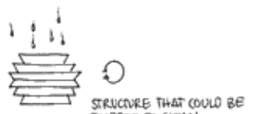


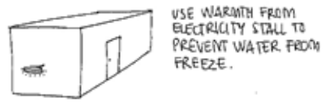


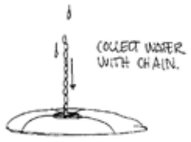


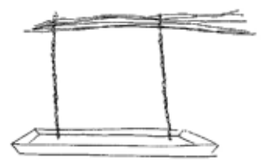


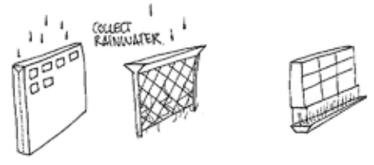


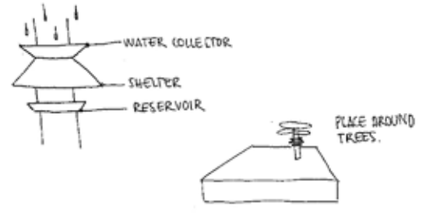






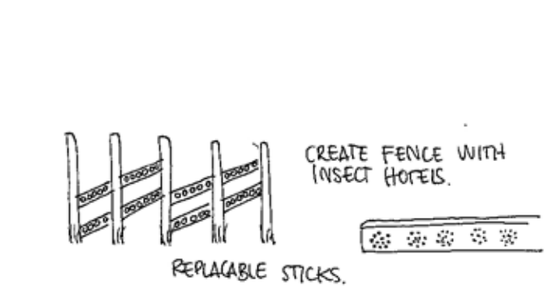


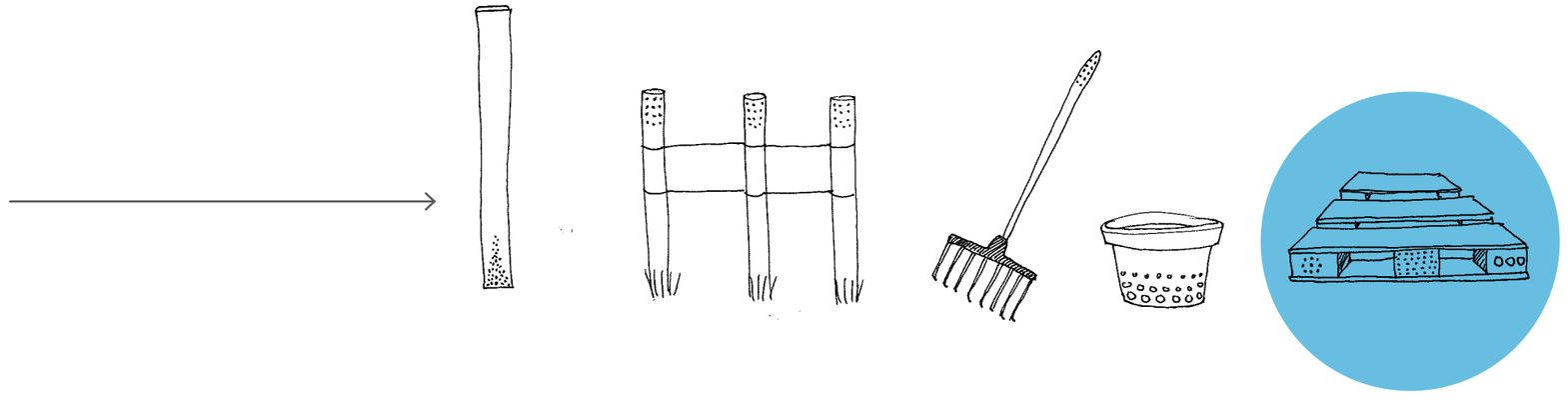


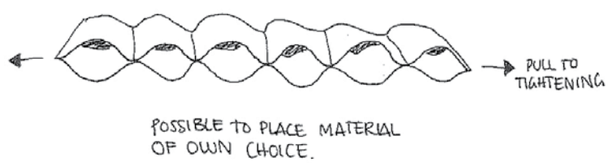


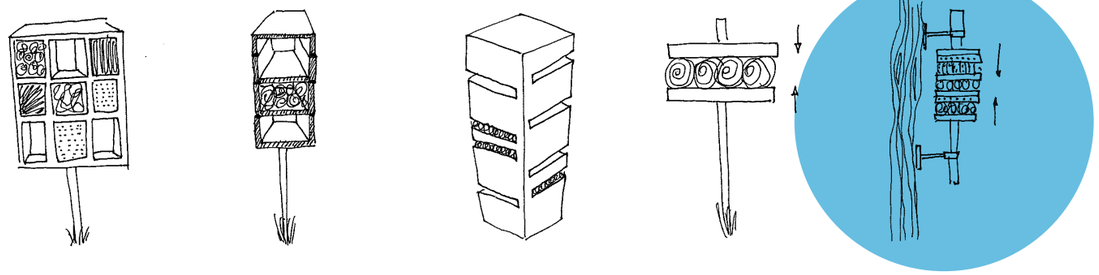
DEVELOPING CONCEPTS

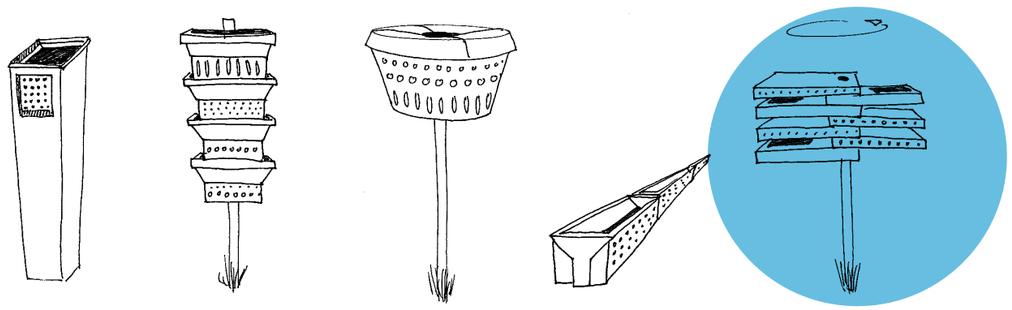
The three chosen concepts was developed further into one product that could represent each concept. A scale model of each product was then created for evaluation and further development.





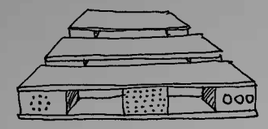






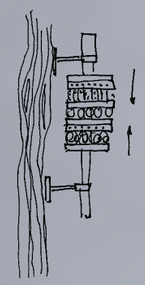
CONCEPT NO. 1

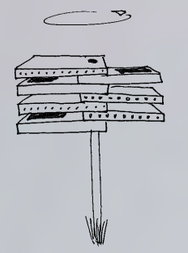
This concept was based on how to, in the simplest way for the farmer, integrate biodiversity into the landscape. By integrating insect hotels into common objects on a farm this could be managed. The farmers doesn't have to make any effort to install and maintain the object. In this case the only thing needed of the farmer was to take the decision to buy an insect pallet rather then an ordinary pallet. By just drilling holes into the wood the simplicity of how to make an insect hotel could be showed and hopefully inspire the farmers to make it by themselves.



CONCEPT NO. 2

This concept was based on how to reduce the cost of the product. There are many rest materials already existing on a farm that are suitable to use in an insect habitat. By providing the farmers with a structure where they could place this material the cost could be reduced. This structure consists of both a wooden and a stone parts. By moving the different sections up and down the material could be squeezed together between two sections. This structure was designed to be fasten on cow sheds or trees to not be an obstacle when farming.





CONCEPT NO. 3

This concept was designed to combine the functions of an insect habitat and a rainwater collector. By using different modules made out of either wood or stones this could be managed. In the wooden parts holes was drilled to create insect habitats. In the stone parts sinkage was made to collect rainwater. The stones could also protect the wooden parts from water and create warm spots for the insects. By placing the parts on a pole they could also be twisted to create different expressions, climates and facilitate installation.

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EVALUATING CONCEPTS

To evaluate the three different concepts the scale models was brought to the farmer Bengt Hellerström in Annelöv. By discussing the ideas some important knowledge was gained and the concept development could continue.

CONCEPT NO. 1

Bengt liked the idea of integrating the insect habitat into already existing objects on the farm because that would be a simple way to show how easy it is to make a change. Bengt believes that few farmers actually know the importance of biodiversity within the agriculture. But he also saw a problem with the reduced function of the object. By integrating the insect habitat the object will be hard to move and reuse.

CONCEPT NO. 2

The idea of inserting your own material into a construction was something Bengt appreciated because this could save money even if it is more time consuming. But he also feared that this is not an opinion he share with all farmers. He says that many farmers want to save time even if it the price is higher. He also thought that the possibility to fasten the object to a wall could be optional.

CONCEPT NO. 3

Aesthetical, this concept was the one Bengt liked the most. He appreciated the different looks the object could get by twisting, the modules. Bengt believed that the engagement of the farmer could be increased if they would be able to take part in the decision making for the final touches. He encourage the use of a pole for attachment because this is simple to handle.

DECISION

The properties chosen to work forward with was; to show the importance of biodiversity and how simple it could be to make a change. Increase the possibility to insert own material to reduce cost. Facilitate for the farmers to take part in the decision making and to use a pole for attachment.

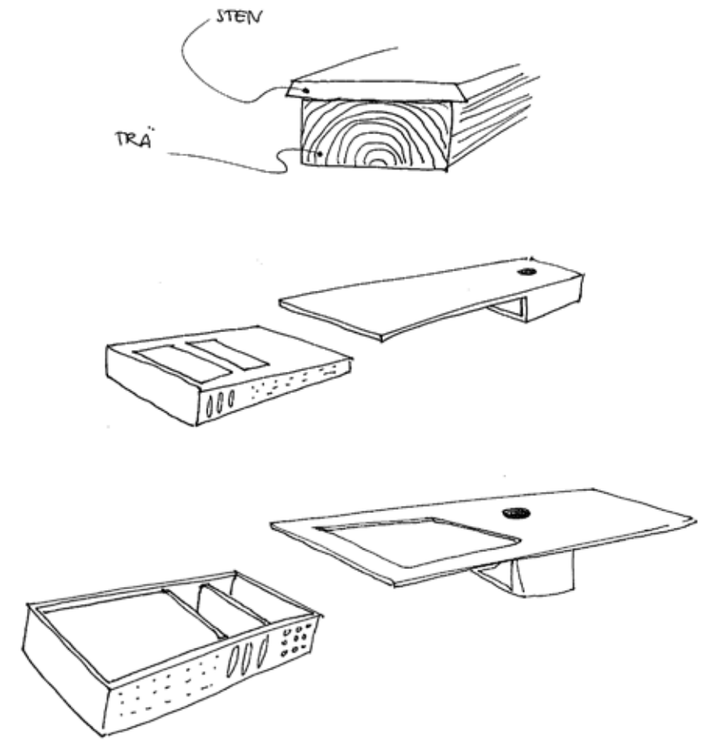
FURTHER DEVELOPMENTS

Based on the acknowledgements gained from the concept evaluation new concepts was developed. The first limitation set to the new concepts was to work with wood, water and stone because these are the three most common elements in a natural biotope.

The new concepts was developed based on these restrictions. The main goal was to create a module where all the three elements could be included. To find the right relation between the elements and how to attach them to each other was also important.

The module that is marked was chosen to work forward with. Here the top part was made out of stone and would work as a roof for the wooden part. It would also collect rain water inthe sinkage on top. The wooden part would create insect habitats. By creating different types of holes, different useful insects could be attracted. Two smaller “containers” in the piece would make it possible for the farmers to insert own material from the farm to reduce the cost.

The two pieces are hold together with a metal part that possibly also could be used to attach different modules to each other.



MATERIAL CHOICE

Before a prototype was built the material choice had to be considered. A couple of basic demands was set up to simplify the selection. The chosen materials had to be sustainable, easy to process in production, inexpensive and stand the outdoor climate.

STONE PART

The reason why stone was chosen as a material to integrate was because of its possibility to store heat and possibility to hold water. With this qualities birds and insects would be supported with both hot spots and water. There are many different natural and composite stone material that posses these qualities. By comparing them with the basic demands one material could be chosen.

Some of the natural stone materials considered was schist and granite which are commonly used in Sweden. These are sustainable material that stands the outdoor climate. On the other hand these natural stones are difficult to process in production which will make the product more expensive.

The composite stone materials are simpler to produce where production methods such as moulding could be used. This method will be less expensive and allows a larger freedom when it comes to shape. Depending on what components that are included in the composite the material could also get other qualities such as a lower density. The components included would also effect the materials sustainability. Some of the composite stones considered was terracotta and concrete.

By comparing the materials with the demands and with each other concrete was chosen as the type of material to work with. Concrete holds all the qualities and is above simpler to produce. Compared with terracotta concrete is less fragile , stand cold better and holds water better.

WOODEN PART

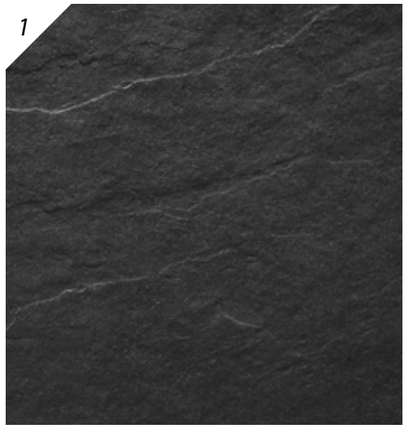
The reason why the wood is chosen as a material to integrate into the module was the way it attracts insects. The wood will be a substitute for tree stems that today are removed from the farms. Not all types of wood suits the insects and this was the first to consider. Because the Swedish insects are the intended inhabitants a typical Swedish wood was the best option. One of the most common trees and a material that often are used in insect hotels is pine. This wood is also less expensive then many other types of Swedish wood.

In this wood different holes has to be made to create habitats for the insects. In production this could be done by a cnc mill which is a time efficient method that wouldnt effect the price of the product too much. To reduce the price even more standard plank out of pine could be used.

The wood would not be treated with any chemicals because this could harm the insects.

METAL PART

The metal part that holds the stone and wooden part together would be made out of stainless steel because this was the most suitable metal for outdoor use.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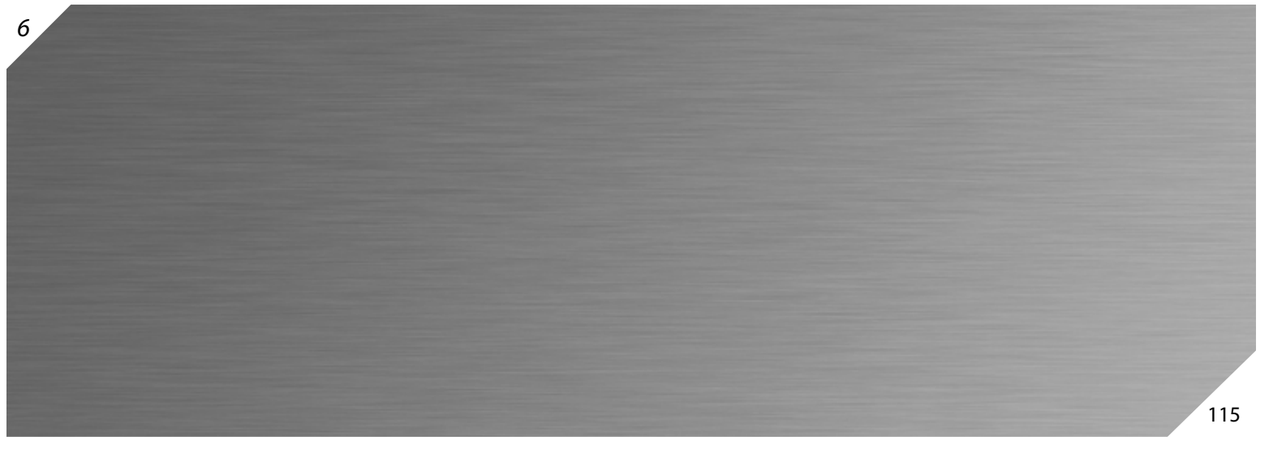
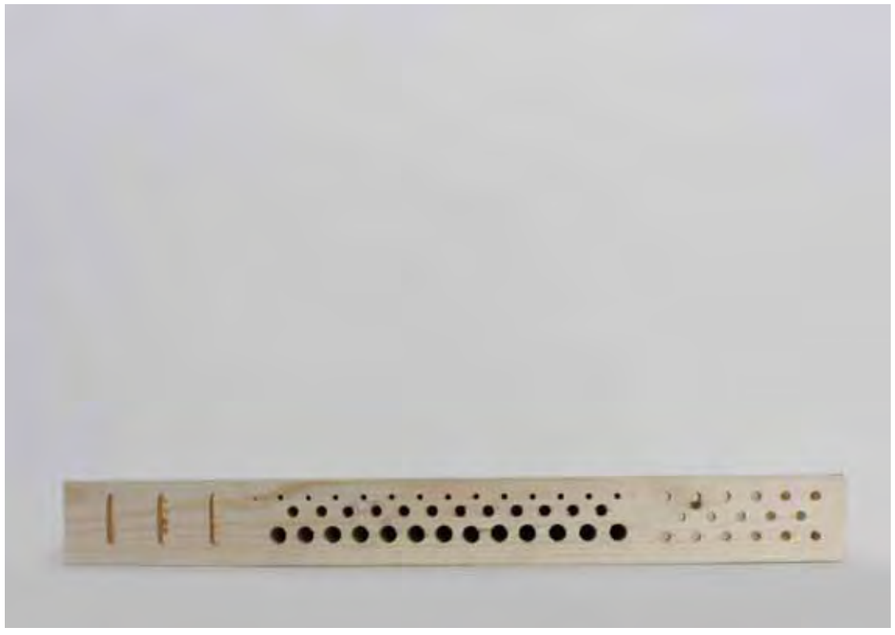

6

BUILDING PROTOTYPE

To be able to see the proportion and get an indication of the weight the concept module was built as a full scale prototype.

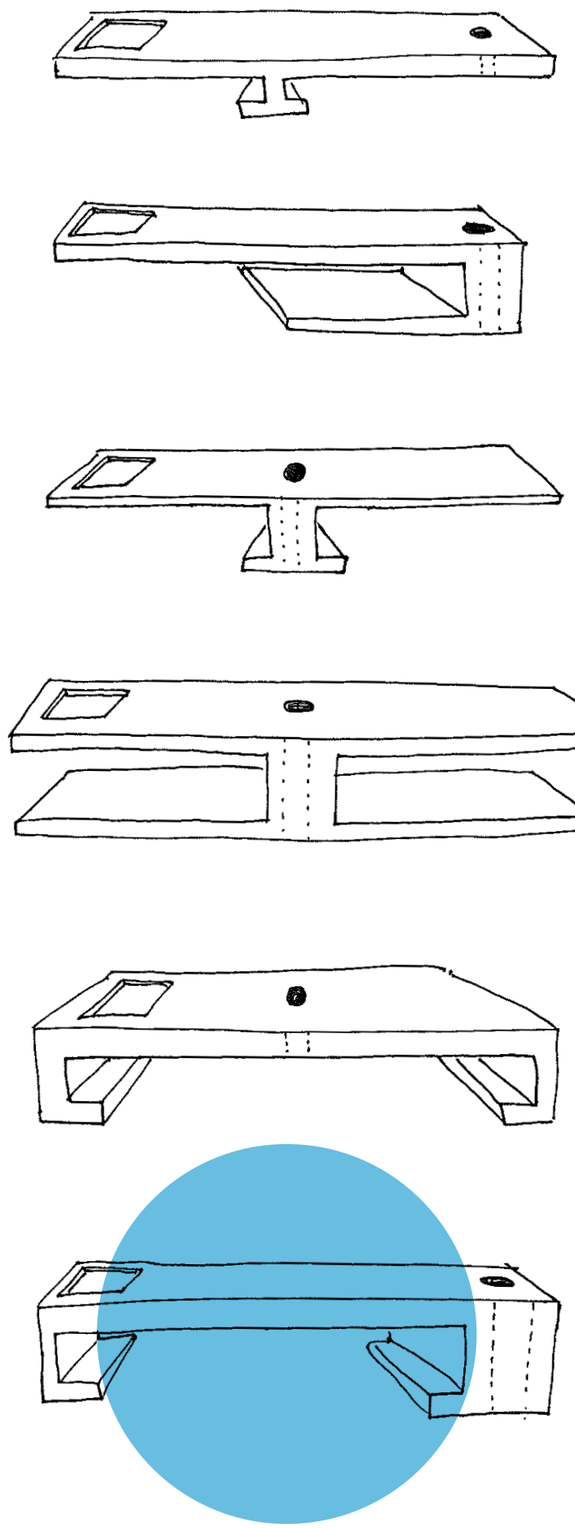
To create holes and “containers” into the pine plank a milling machine and a drill was used. The concrete part was moulded. To increase the strength in the concrete construction armature was integrated. The metal part that was suppose to hold the two parts together was not stable enough and was excluded from the module. This problem had to be solved in another way. The finished prototype was placed outside during one week to see how the material behaived and how it would stand the outdoor climate.



FURTHER DEVELOPMENT

Refinements to the modules and the attaching system had to be done. The goal was to find a structure where the metal part, that connected the two part, could be removed to minimize parts. If placed on a pole it was also important that the shape of the modules was balanced to reduce the risk of tilting. Here both structure and shape was reconsidered.

The module that is marked was chosen to work forward with. The construction would be moulded in concrete and hold the wooden part without any extra metal part. The wooden part would be simple to slide into the concrete structure to facilitate maintenance. By creating a cover of concrete the wooden part would be protected from moist and last for longer.

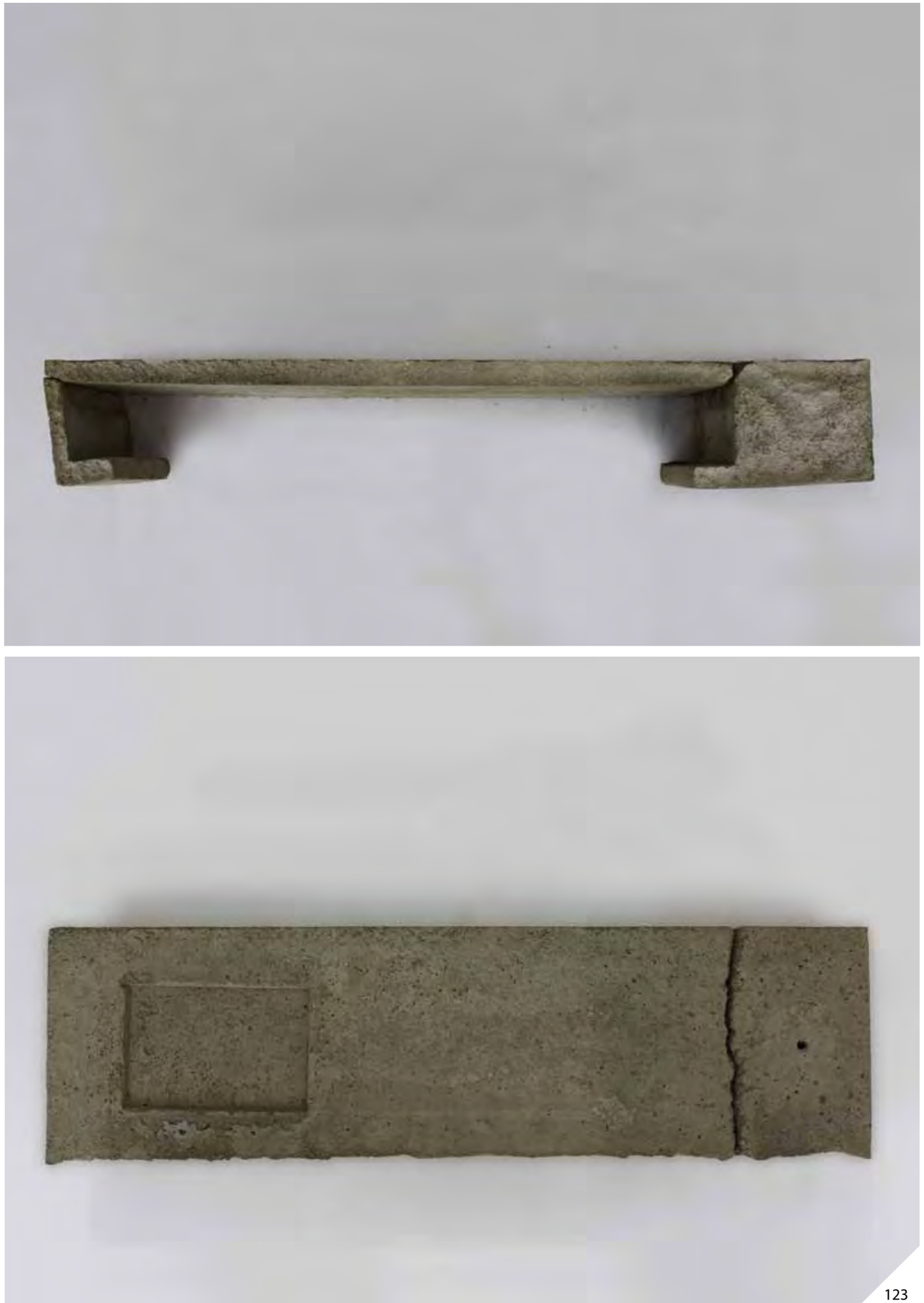


BUILDING PROTOTYPE

To be able to value the strength in the construction and to see the proportion of the concrete part a new full scale prototype was made. The concrete part was moulded in this mold and strengthen with armature.

EVALUATING PROTOTYPE

As shown in the picture the strength in the concrete construction was poor. In the two corners, where the concrete was as thinnest it broke. In this case the hole, for attaching the module to a pole, was placed on the left side. This created instability. To work forward with this concept the construction and the attachment system to the pole had to be refined.



FURTHER DEVELOPMENT

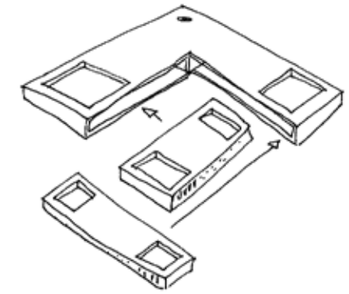
The goal with the refinement was to find a concrete construction that was easy to attach to a pole, strong, in balance and could hold the wooden part without adding any extra parts.

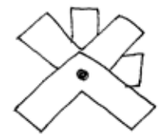
The module that is marked was chosen to work forward with. The moulded concrete construction would hold the wooden part without any extra parts. The wooden part would be easy to slide in and out of the construction to facilitate maintenance.

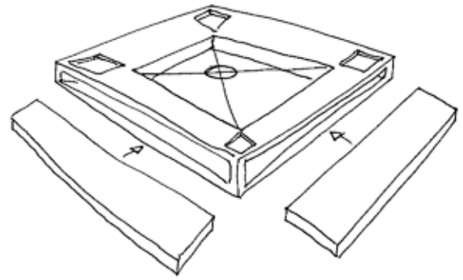
By using a construction that covers the wooden part, and especially the sensitive end grains, will be protected from moist and will therefor last for longer.

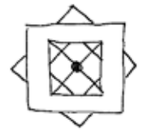
The shape and the centring of the hole would create a more balanced module which would prevent the pole from tilting. Because of the relative simple shape the moulding will also be simplified and less expensive.

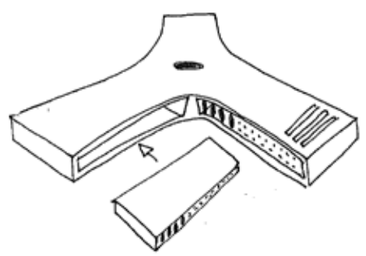
To increase the construction strength the shape was designed as an unit that will support both press and pull forces.

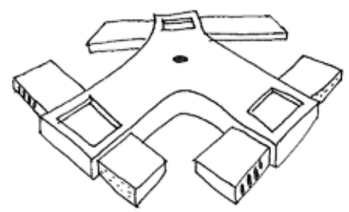


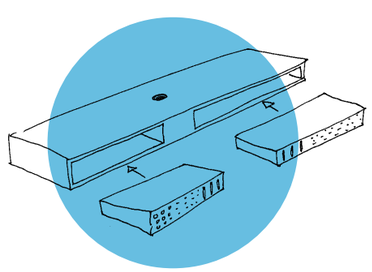










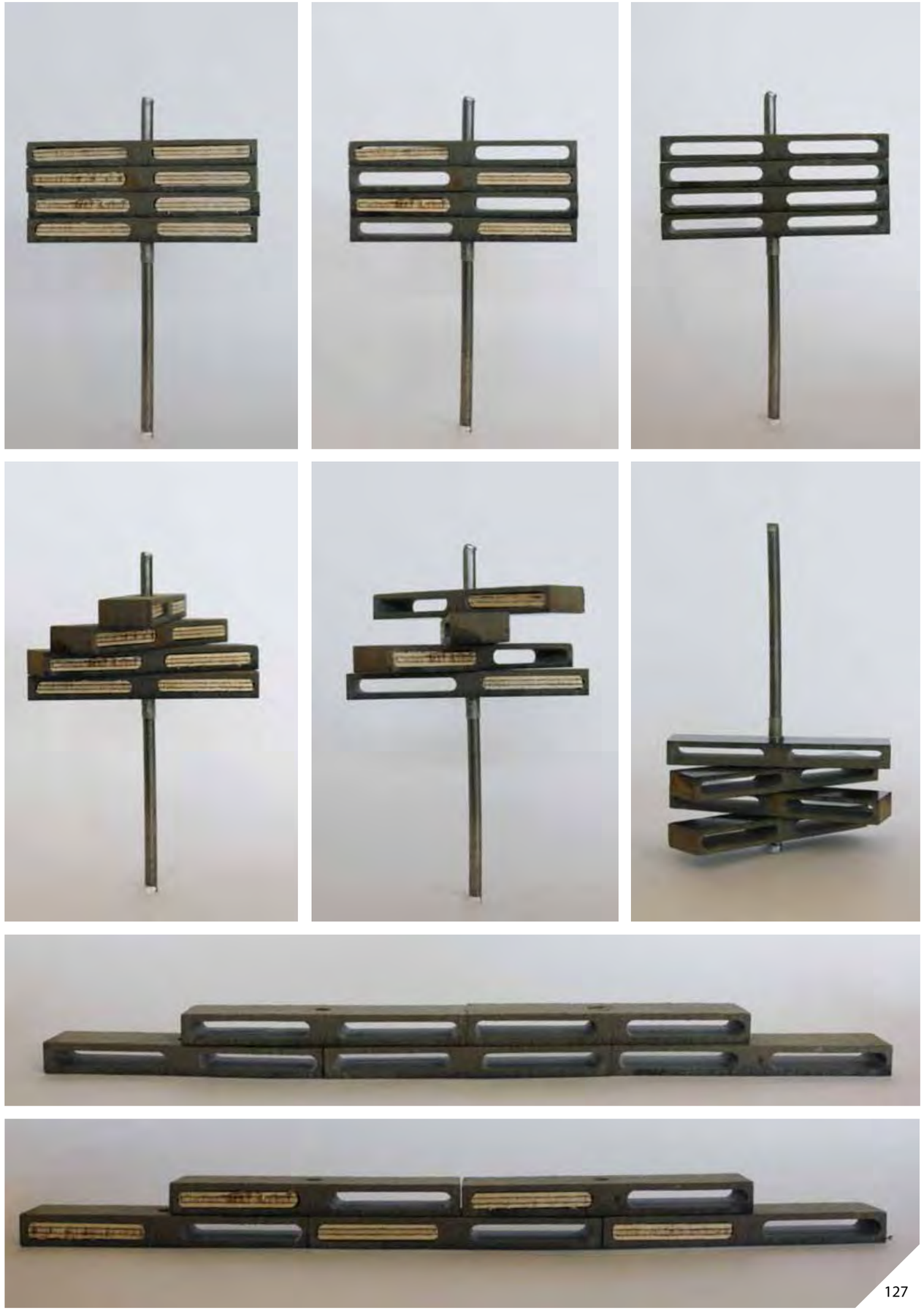


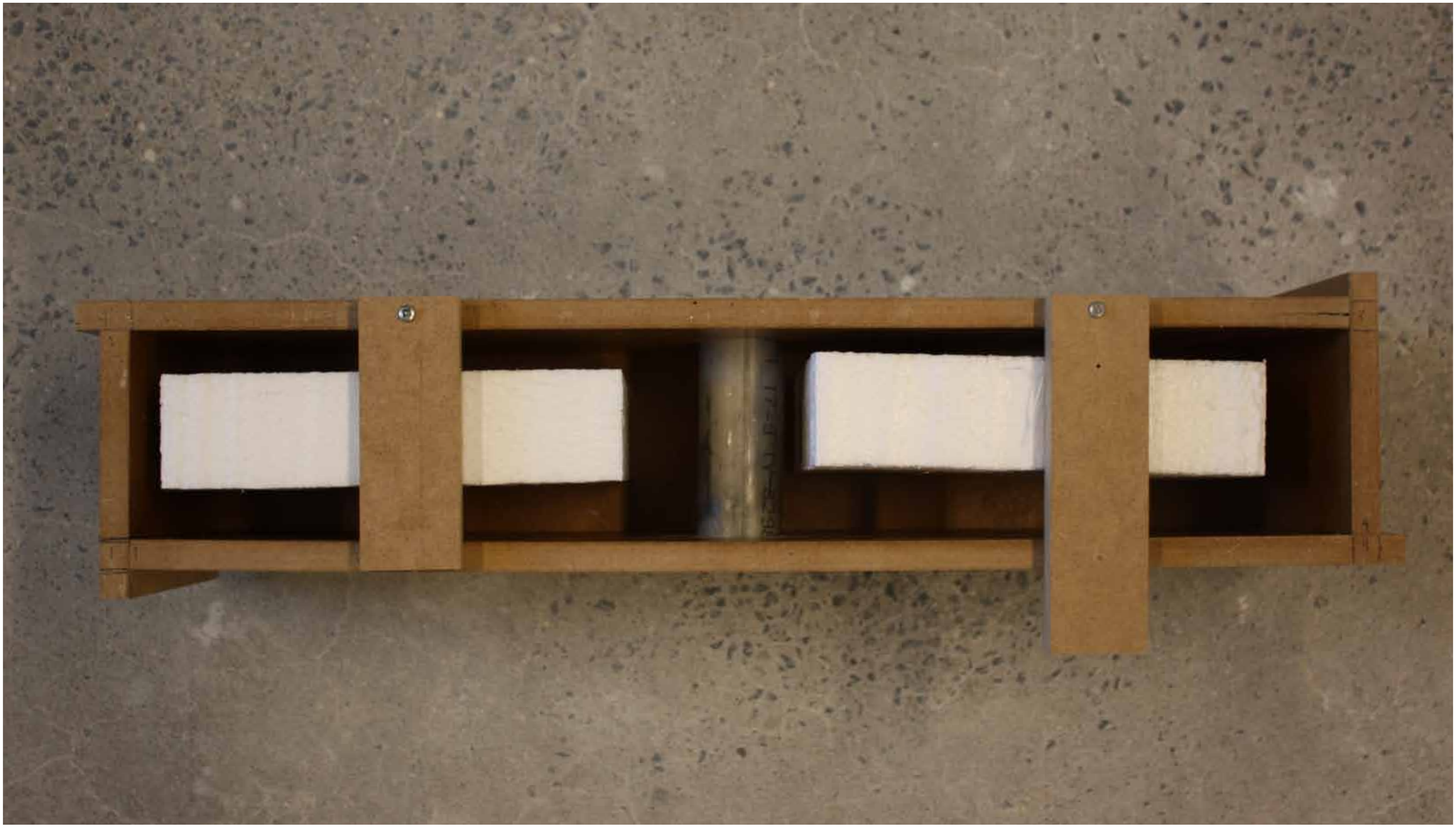
BUILDING SCALE MODEL

When the construction was refined a scale model was built to evaluate the proportions. When playing with the scale model many variations was discovered that gave the object new expressions and functions.

The modules could either be placed on a pole that would reduce the risk of being an obstacle in the farming landscape. It would also give the farmer the possibility to rotate the different modules to create different expressions.

When the concrete is enclosing the wooden pieces a possibility to place the module on the ground occur. Because of the concrete bottom the wooden piece will not be harmed by moist from the ground.



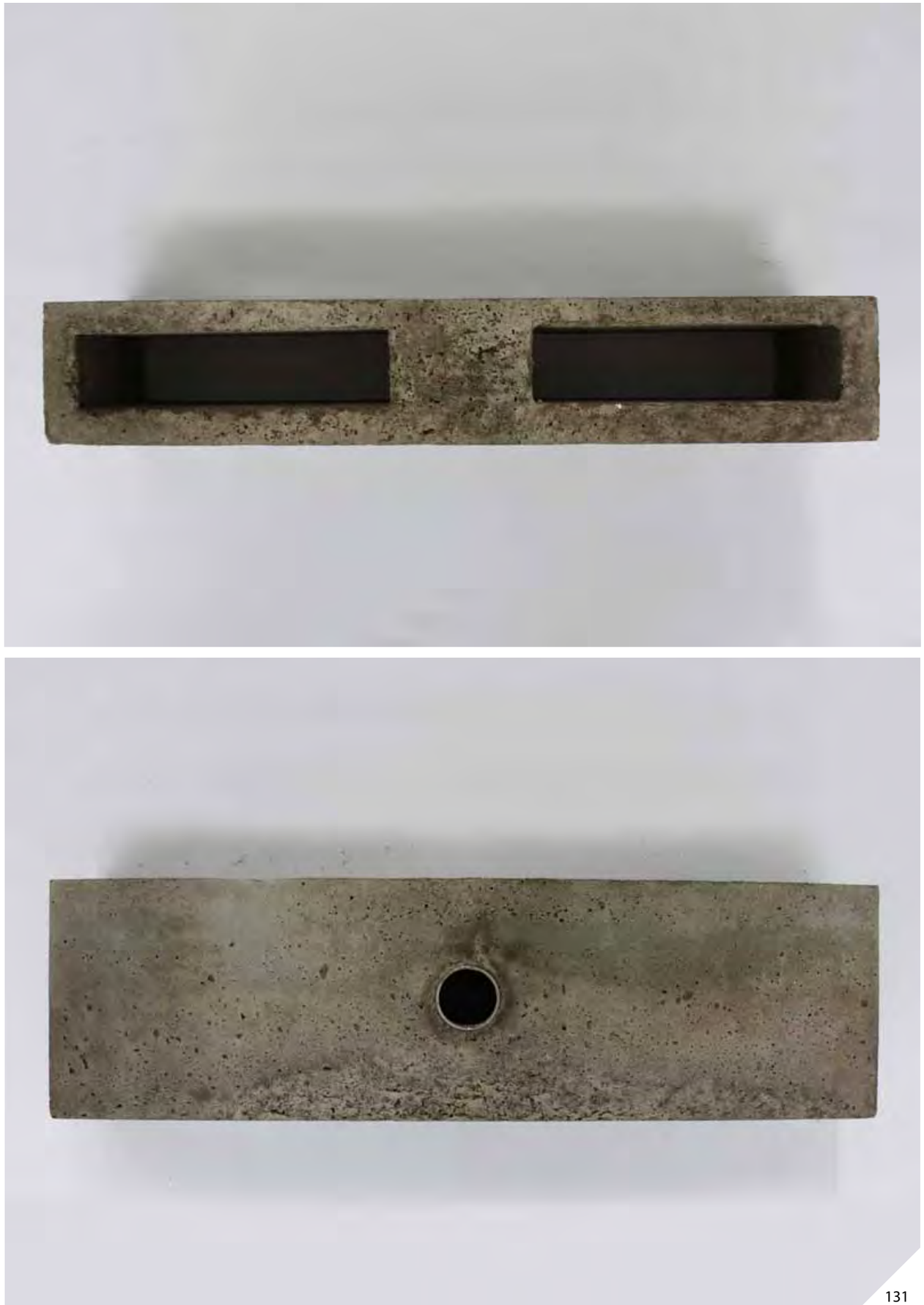


BUILDING PROTOTYPE

To be able to evaluate the developed concept a new full scale prototype was made of the concrete part. A pipe, that would be placed on to the pole, was moulded into the concrete. The Styrofoam was used to create the holes in the module. No armature was integrated to improve the sustainability of the product. Instead the thickness of the walls was increased.

EVALUATING PROTOTYPE

The mold for the concrete part worked as expected. The thicker walls and the new construction made the module stronger without adding extra armature. The weight of the module was 8 kilos but due to the new construction the walls could possibly be even thinner which could reduce the weight.



REFLECTIONS

A 3D model was created. Material was bought to the model making. Technical drawings was made and sent to producers to get a price indication. But with five weeks left before presentation everything stopped.

During a consultancy with one of the supervisors an important question was asked. Is this really the simplest solution to the problem? The answer was no. The ideation had started with a fairly simple product but throughout the process it had developed into a complex module.

The module now consisted of 20 parts. Plank and concrete was used to imitate natural wood and stones already existing on the farm. At the metal pole a plate had to be attached to stabilize the structure. This covered 30 cm in diameter on the ground which made the function of the pole unnecessary. The process of creating the concrete and wooden parts would increase the price. The goal with this product wasn't to earn money but to help the environment. Therefor the production and cost also had to be considered once again.

There was still positive aspects of this solution but was it enough? The advice provided from the supervisor was to consider a simpler solution during the weekend.

To find inspiration for new ideas my view as a designer was important. What is design for me? I came to think about the vision I have written for my portfolio which describes this quite well.

...once again the little girl pulled of the lid from the hand woven basket and instantly felt the strange but familiar smell in her nose. She put her head curiously down in the basket and pulled up a car made out of Coca-Cola cans. The little girl loved the basket because it was full of strange things, like necklaces made from porcupines, flyswatter made from elephant hair and instruments made from seeds. This was nothing that could be found in any other toy store. It was different.

This basket did not only contain interesting object, it was also filled with memories. Every product had a unique story to it that the little girl loved to hear from her parents as often as she could.

This little girl is me and it is not until later I have realized why this hand woven basket with all its content was one of the most interesting things during my childhood.

This basket was brought back to Sweden from Mozambique, where I grew up with my family. In the basket my parents had gathered different things they bought during these years to save as memories. These things with their simplicity, creativity and unique story still interest me. The creativity to solve problems by using materials you already have around you is, for me, design.

With this in the back of my mind a new phase of the project started.

TAKING ANOTHER TURN

A bit stressed but also inspired a new concept generation started to explore if it was possible to find an even more convenient solution to the problem.

While the brief was still the same the focus had to be changed. To create a more sustainable product the focus was now put on how the natural material, already existing on the farm, could be used and gathered in a structured but also functional way. Therefor it was decided to work with some kind of container.

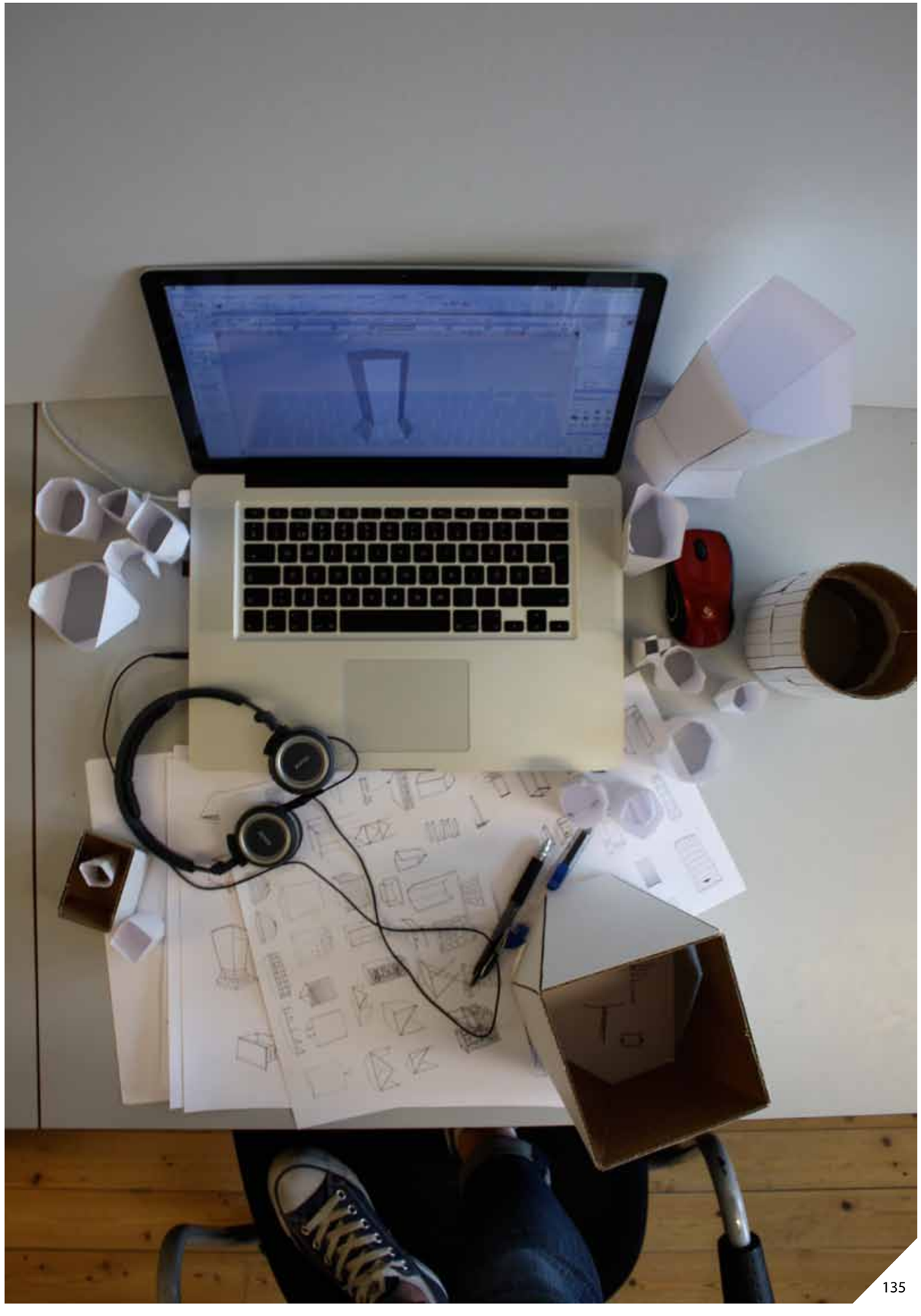
The product had to be simpler to install and therefor it was decided to remove the pole and place the module directly on the ground. Important was then to not cover a big area on the ground but rather work vertical.

Typical materials found on a farm, that is suitable when creating an insect hotel is stones, pebbles, logs, branches, bark, hay and leaves. These materials would attract different kinds insects. They would work well together and could therefor be placed within the same container. The stones and pebbles will attract ground living insects such as beetles and spiders. The wooden material will attract solitary bees and lady birds while the plant material will attract butterflies and lacewings.

The materials have different life spans and has therefor to be maintained differently. The stones will last for a lifetime while the logs, bark and branches will last for a couple of years, if protected from water. The hay and leaves has to be replaced every year.

To facilitate the maintenance and create a stable construction the materials had to be placed in the right order. The heaviest materials, that also are the material that lasts for longest, would be placed in the bottom. The lightest material, such as leaves and hay, would be placed on top to facilitate maintenance and the wooden material in the middle. To make this work the instructions for the farmers has to be clearly stated to minimize the risk of misunderstandings.

The first step was to find a functional shape. By sketching and making quick sketch models a hour glass shape was chocen to work forward with. This shape would facilitate the sun to heat the stones and create a stable bottom. The top would have an angle to prevent rain water from getting in and a wide top to facilitate filling.



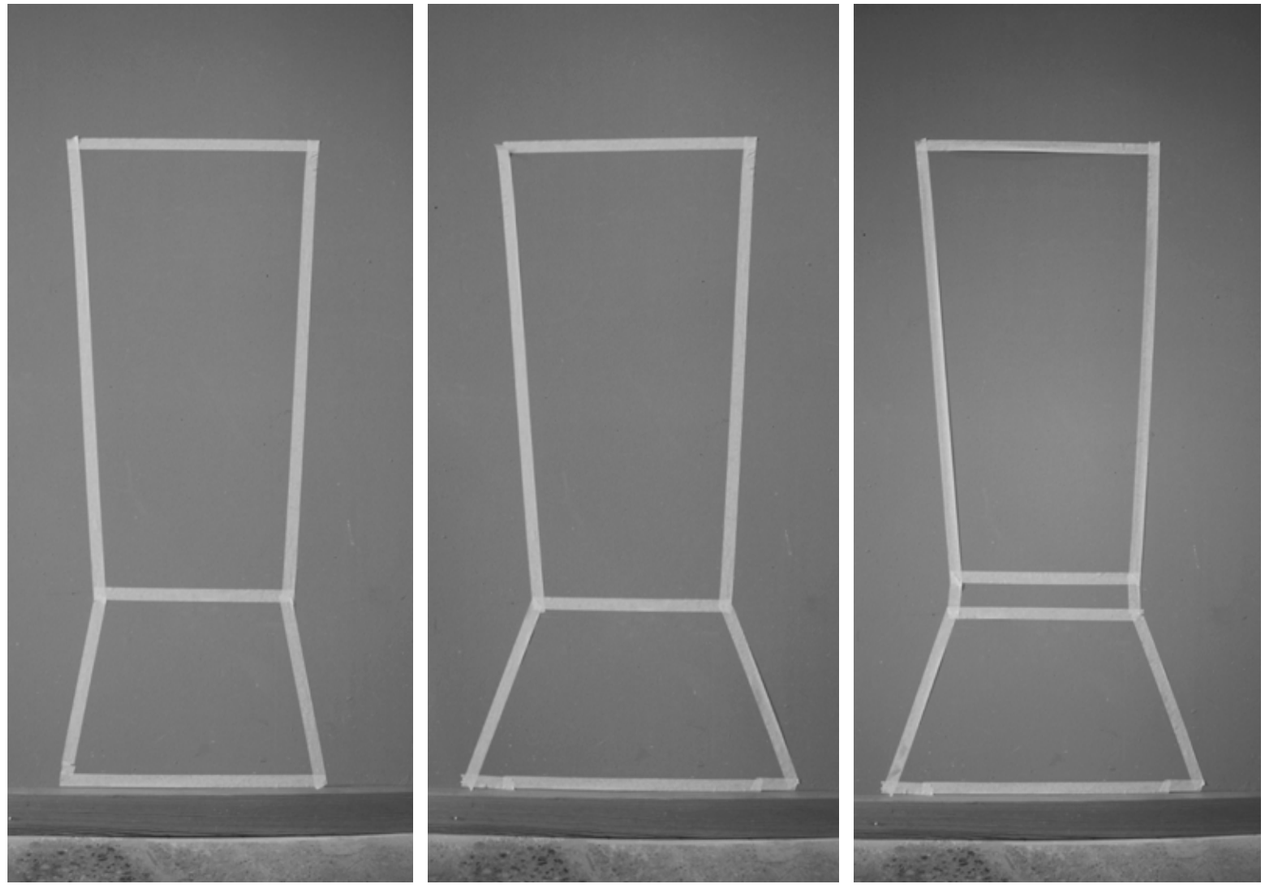
BUILDING MOCK UPS

When the shape was decided the proportion had to be considered. The module had to be big enough to contain the materials without becoming too clumsy to handle. To create a wider spreading of species it would be preferable to place smaller but several modules within the area. Therefor the size of the module was limited.

First a full scale tape model was created. This gave an understanding for the height and width. The tape model to the right was chosen to work forward with because of the stable but still slick look. It was decided to work with a round shape because this, together with the angles, would create a variation in climate around the module with sun, shadow, wind and shade.

To get a better understanding for the construction a scale model, 1:2, was built with the proportions from the tape model. It was decided to work with two parts. A stationary bottom part where stones would be placed and a mobile top part, for wooden and plant material, that could be removed for maintenance. By making them into two cone shaped parts the transportation and storage would also be facilitated. To separate the top part into two sections, a plate was created and inserted.

A lid was added to prevent rainwater from getting into the module and at the same time create a water source for birds and insects. At the bottom a small section was added to improve the stability. If the ground, where the module is placed, is tilting this section could be pressed into the soil to make the module stand straight.



BUILDING FULL SCALE MODEL

The last step before deciding on the final shape was to build a full scale model. In this model a perforation of the surfaces was also tested. The holes was made to create access for the insects to the materials. The shapes and sizes was vairiating depending on the content stored within the section.







REFINING FULL SCALE MODEL

The full scale model was refined with the help of a couple of friends. Their first reaction was that the size of the module was bigger then they expected and asked if that would create a problem when installing the piece? The conclusion of the discussion was no. Because the module could be carried out without content the weight would not be a problem. The possibility to transport the module with tractor would also reduce the problem.

In the end the workshop limitation defined the size and unfortunately the height of the top part had to be reduced with 5 cm. This gave the module a total height of 90 cm. Important with the height was that it shouldn't exceed one meter which is a common height of crops. Because the bird bath was placed at the top of the module the birds would becomes quite visible for preditors. If the module was slightly lower then the crops they would be more protected.

The bottom of the module was the widest part with 50 cm in diameter to create stability. The waist was 30 cm to create the right angles at the top part and bottom part. The top diameter was 40 cm to facilitate filling. The width had to be wide enough to fit a sufficient amount of material to prevent the wind to blow through. This would create a sheltered place for the insects within the material.

PERFORATION

The goal with the perforation was to create access for the insects to the material that is stored within the module. This perforation would also be used to guide the farmers where to put which materials.

The holes at the bottom part was big to facilitate for the sunlight to reach the stones and increase the access for birds, looking for insects. It would hopefully also guide the farmers to place the biggest and heaviest materials here.
The top part was divided into two part with a plate in between. To show the two sections a small gap between the holes was created. In the first section wood material such as logs will be stored and therefor the holes were bigger. In the second section plant parts such as hay and leaves would be stored and to prevent them from blowing through the holes they were made smaller. The long slots were made to facilitate for butterflies and lacewings to access the plant parts.

The size of the holes was designed to prevent other animals from removing the materials. The holes are placed in the direction of the module. This would facilitate the roll in the production process. The perforation in the first prototype was more frequent but to eliminating the risk of reducing the strength in the material it was chosen to use a less frequent pattern.

In these prototypes a handle was also integrated to facilitate the handling of he product. The possibility to have external handles was also considered but due to extra costs and complexity this was not chosen. To improve the ergonomics of the handles a round shape was chosen.

PLATES

The module consists of three sections; one where stone material would be placed, one where wooden material would be placed and one where plant material would be placed. To divide these sections plates was decided to use. One plate to place in the bottom of the bottom part which will hold the stone material. One plate to place in the bottom of the top part to hold the wooden material. One Plate to place in the middle of the top part to hold the plant material.

To prevent rainwater, that possibly could get into the module, from soaking into the material drainage holes had to be integrated into the plates. At the plates it was also a possibility to integrate information to the farmer of what to place within each section. To fit both information and drainage holes it was decided to combine them. Different variations was tried out in 2D before settling for the final design.

At the top plate, where plant material would be placed, a simple handle was also added to simplify maintanence.

LID

The last part to consider, before starting the process of building the model, was the lid. The function of the lid was to protect the material from water, to minimize maintenance, and to create a water source, out of rainwater, for the birds.

To collect rainwater the lid had to have some kind of concave surface. The depth was decided to 12 mm to facilitate the birds when bathing and reduce the presence of algeas. First an organic shape was created but when combined with the module the expression did not match. To fit the aesthetic of the module a decision was taken to work with a more geometrical shape. Different angles was considered and tried out in 3D and cardboard mock ups. The end result was a simple shape with straight edges. A longer bottom part was added to better fasten the lid to the module.

The edge around the water source was broaden to create a place where the birds and insects could sit.

With a clearer vision in mind the process of building the model started.

REALISATION

making the chosen concept feasible

MATERIAL CHOICE

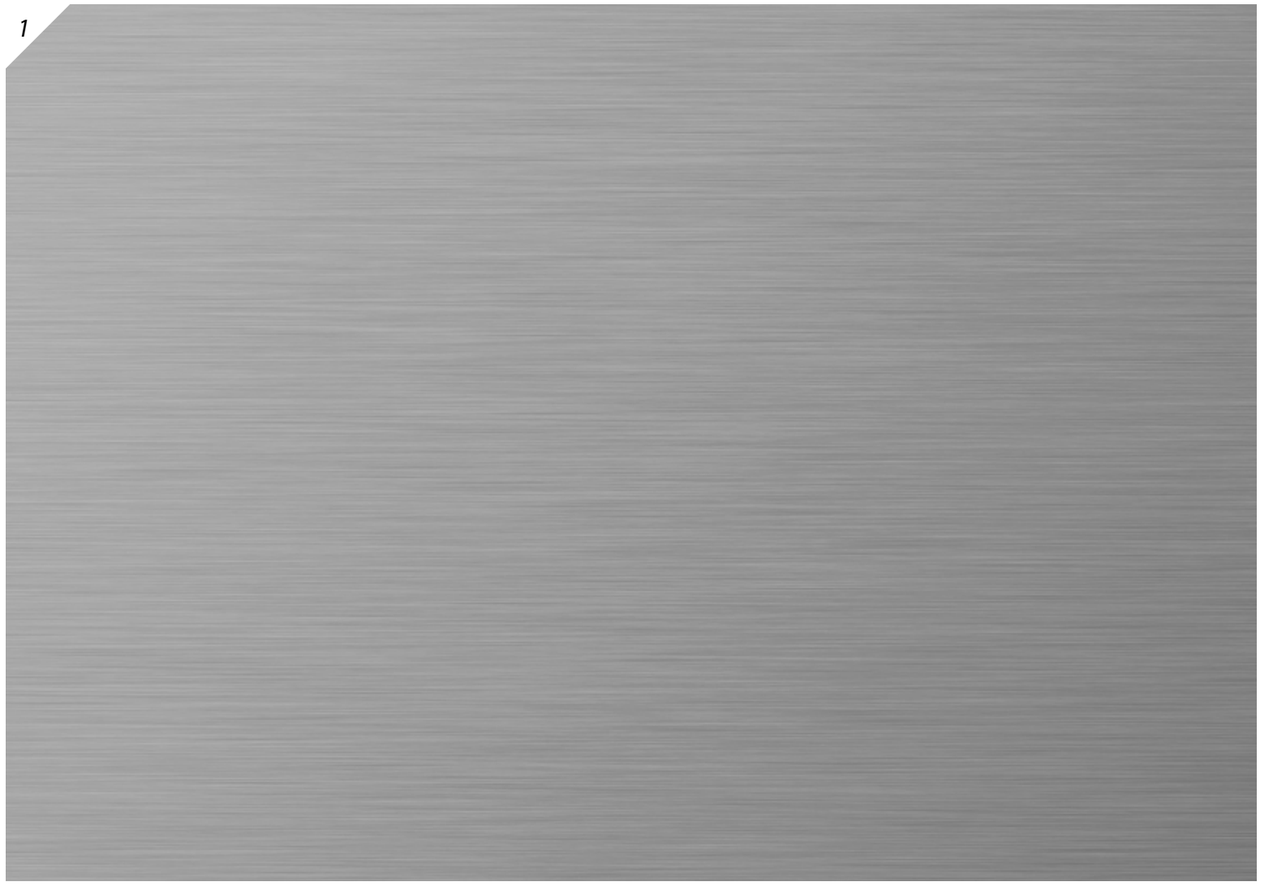
The material choice had already been considered earlier in the process which made the choice easier this time around. Concrete, pine and stainless steel was then chosen for the module with consideration of sustainability, cost, production methods and outdoor durability.

Except the old considerations the new module created new demands on the material. To be able to hold heavy stones and logs the material had to be strong. The durability was also important to facilitate rough handling with, for example, tractors. To fulfil these demands metal was chosen as the material to work with.

There are many different types of metals with different properties. These properties would effect the production methods and the aesthetics of the product. Aluminium, for example, is a light material that is easy to process. But due to its properties it is difficult to weld and therefor other kind of attachment systems, such as rivets, has to be used. Steel is a durable metal that is easy to weld and process. Due to its low resistance to rust this is unfortunately not a good choice for an outdoor product. Stainless steel is a strong metal and is therefor requiring more energy when produced. But because of the strength in the material it is possible to reduce the thickness of the product and thereby give it a slicker look. Due to its resistance to rust no surface treatments is needed. The surface is partly reflective and will therefor blend into the environment. Because of these qualities stainless steel was chosen as the main material for the module.

The lid of the module had the same kind of demands as the earlier module and therefor concrete was suitable even in this case. The lid would work as a bird bath while the rest of the module would create habitats for insects. The two parts have different function and by using different types of material this could be shown.

1



2

PRODUCTION

The production of the module had to be done in several steps. The aim with the production was to maximize the durability and minimize the price.

THE METAL PIECES

The cone shaped metal pieces and the plates, with perforation, would be cut out with the help of a water jet. The cone parts would then be rolled and welded together. The cylindrical parts that serve as the connection between the top and bottom part would be cut out of a metal tube with the right diameter. The cone part and the cylindrical parts would then be welded together. If the welding becomes too expensive pop rivets could be an alternative attachment method. Nuts, that would hold the plates, could then be screwed on. Eccentric locks, that would hold the top and bottom part together, and the handle would be added with the help of pop rivets.

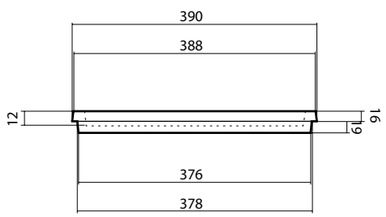
THE CONCRETE PIECE

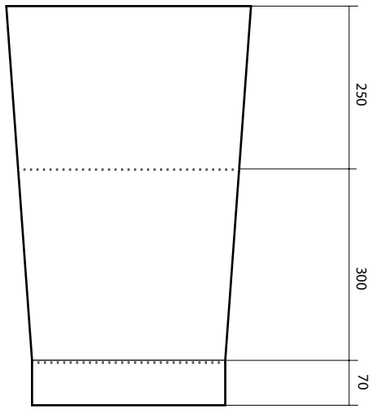
The simplest way of producing the concrete part is to mold it. By using draft angles when moulding, the concrete would be easier to get out from the mold and could therefor be reused. In production these moulds are made out of metal to make them more durable.

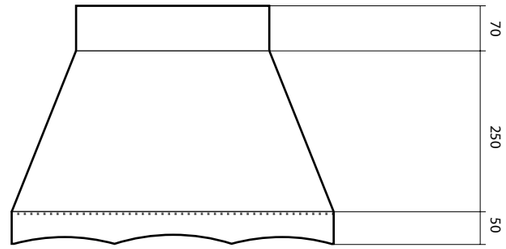
REFINEMENTS

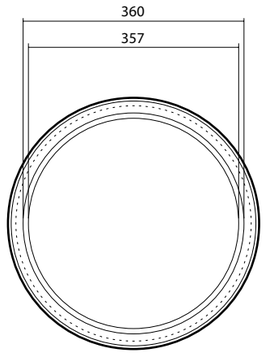
This was a first suggestion of how the production could be managed. There are also many other possible methods and the process has most likely to be refined before starting the final production of the product. To find a suitable producer, that could fulfils the demands, is important because it will also effect the end result. Therefor a more in depth research has to be done within this field before the final production could start.

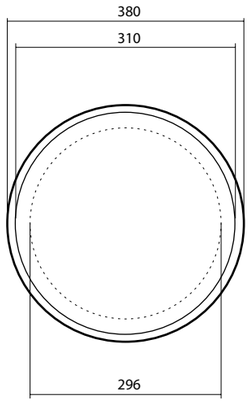
TECHNICAL DRAWINGS

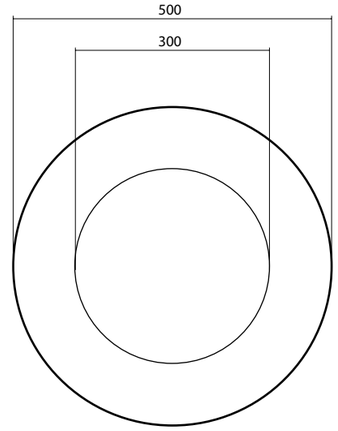












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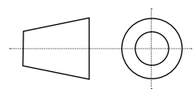
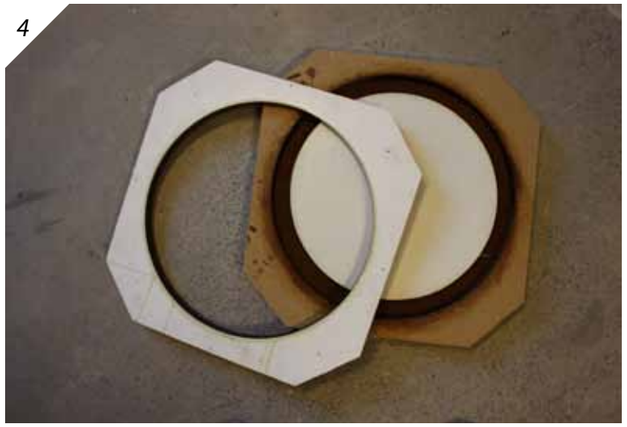
ARTIFICIAL BIOTOPE	1:10	27.5.2012	

BUILDING MODEL

When he shape was decided the production of the model could start. The process of building the model was planned to mimic the real production of the model and had to be managed in several steps.

1. The metal parts was cut out with a water jet
2. The parts was rolled to the right shape
3. Some of the parts was welded together
4. The mold to the concrete lid was lathed
5. The concrete lid was moulded
6. The metal parts was sanded
7. Screws and eccentric lock was attached

It was decided to not use any surface treatment to create a more honest look. The removal of this process would also reduce the price of the product. The process of building the model took two weeks. This was less then expected but because of the simple construction and few parts it was possible.



THE SUSTAINABILITY FESTIVAL

During two weeks a sustainability festival was taking place in Lund. The aim with the festival was to create both commitments and contributions to increase the knowledge about climate and environmental issues. The festival program contained approximately 180 items on the agenda: Inspiration Lecture, hands-on activities, lunch, tours and film screenings and much more.

The opportunity was given to exhibit this project at the festival. This chance was of cause taken and a graphic, that summarized the project, was created and exhibited. At the vernissage the project was also presented for the audience.

The exhibition gave the project valuable attention. New contacts was created and many interesting comments was received. Hopefully the display of the project would lead to further developments of the product and concept.

RESULT

presenting the final concept

FUNCTIONS

Here the final concept and product is presented. An artificial biotope to increase the chance of survival for the agricultural birds.

1. First section in the top part. Here plant material should be placed such as leaves and hay. This material will create important hibernation areas for butterflies and lace wings. The butterflies will support the farmer with pollination and also the birds with food. The lace wing feeds on green flies and will therefor reduce pest on the farm.

2. Second section in the top part. Here wooden material should be placed such as logs, bark and branches. This will create important habitats for the solitary bees and ladybirds. The solitary bees will support the farmer with pollination. The lady birds feeds on green flies and will therefor reduce pest on the farm.

3. The bottom part. Here stone material should be placed such as stones, pebbles and sand. When the sun hits the stones insects will use them to increase their body temperature. Beetles and spider will also create habitats here. These insects are common food for the agricultural birds.

4. Concrete lid which collects rainwater and creates a bird bath.

5. Entrances holes to plant material designed for insects such as butterflies and lace wings.

6. Screws to supports the top plate.

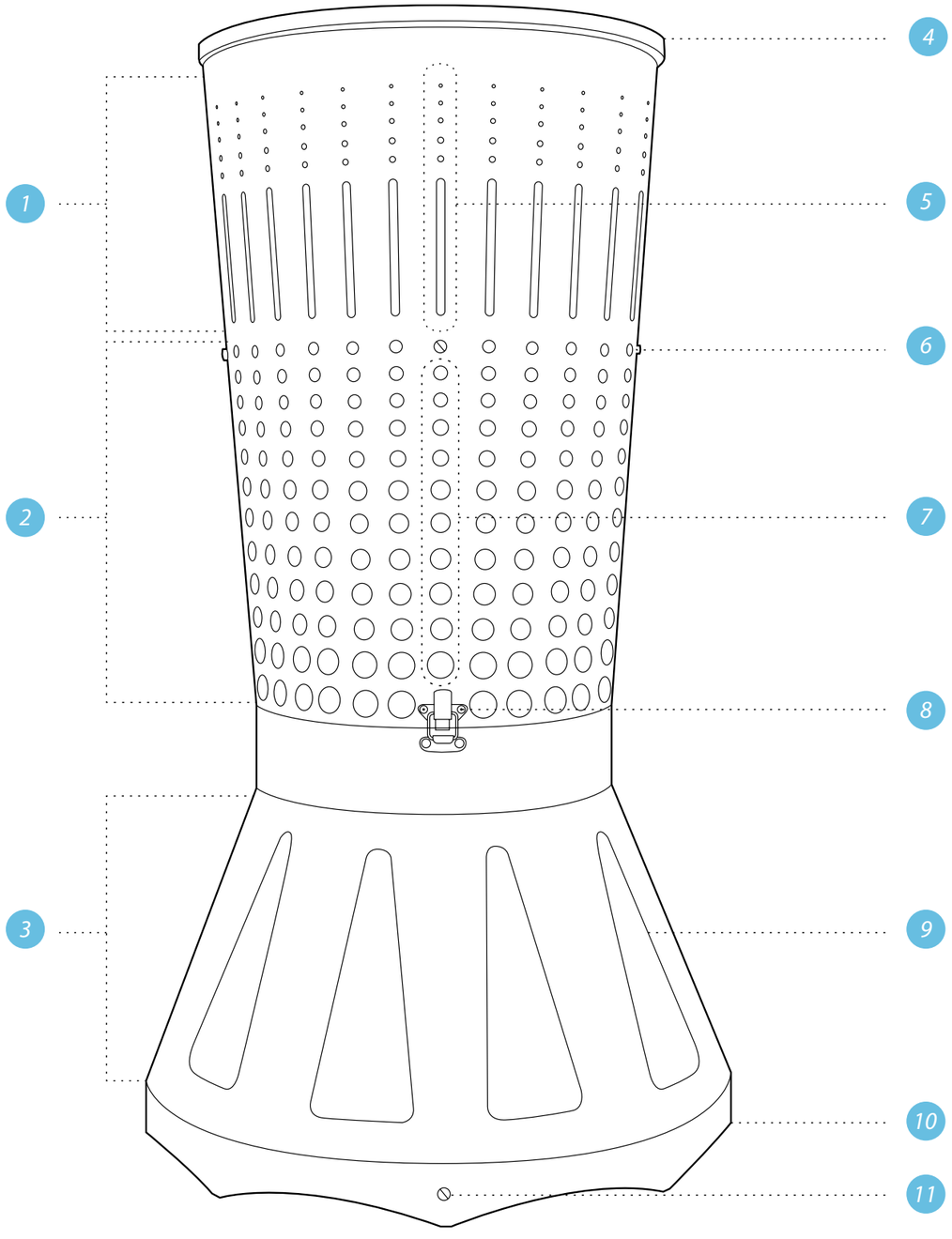
7, Entrance holes to wooden material designed for insects such as solitary bees and lady birds.

8. Eccentric locks to connect the top and bottom part and increase stability.

9. Entrance holes to stone material designed for ground living insects such as beetles and spiders.

10. Bottom part to push into the soil to increase stability.

11. Screws to supports the bottom plate.



INSTALLATION

The installation of the artificial biotope is planned to minimize the workload for the farmer. It will be managed in several steps and is described in the graphics to the right.

1. Transport the module to a suitable rest area on the farm where it could be placed. The transportation could be managed with tractor or by hand.

2. Remove the top part from the bottom part by using the handles.

3. Insert the bottom plate to the bottom part and fastening it with the screws.

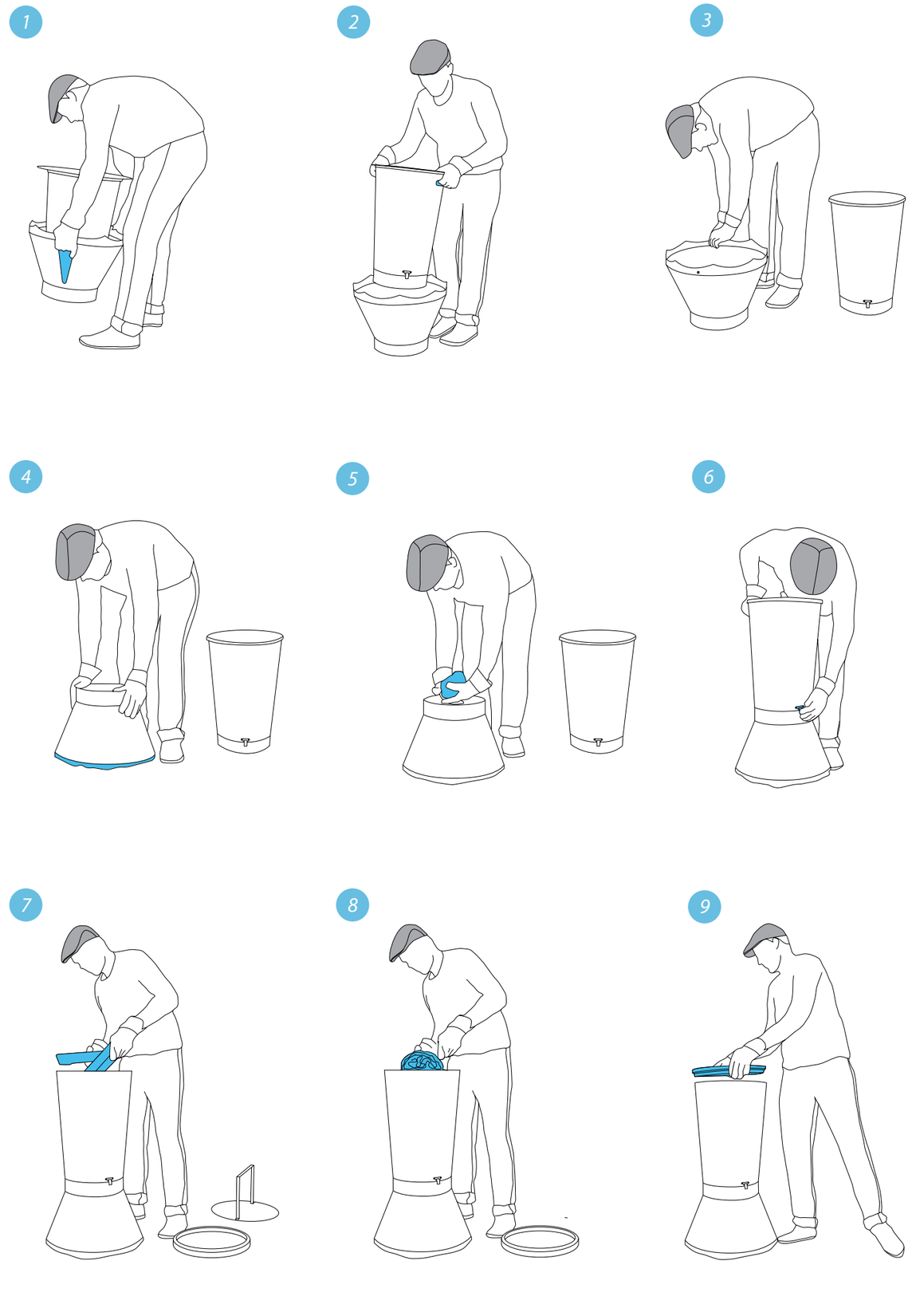
4, Push the module into the ground to increase stability.
5. Place stone material in the bottom part.

6. Place the top part on the bottom part and fasten with the eccentric locks for extra stability

7. Place wooden material in the second section of the top part.

8. Insert the top plate and fill the first section of the top part with plant material.

9. Place the concrete lid on top of the module to protect the material from water.



MAINTENANCE OF PLANT MATERIAL

Every year maintenance of the plant material has to be carried out to provide the insects with decent hibernation areas. The old material has to be replaced with new material. This could be managed in a few steps by the farmer and is described in the graphics to the right.

1. Arrive to the area where the module is placed.

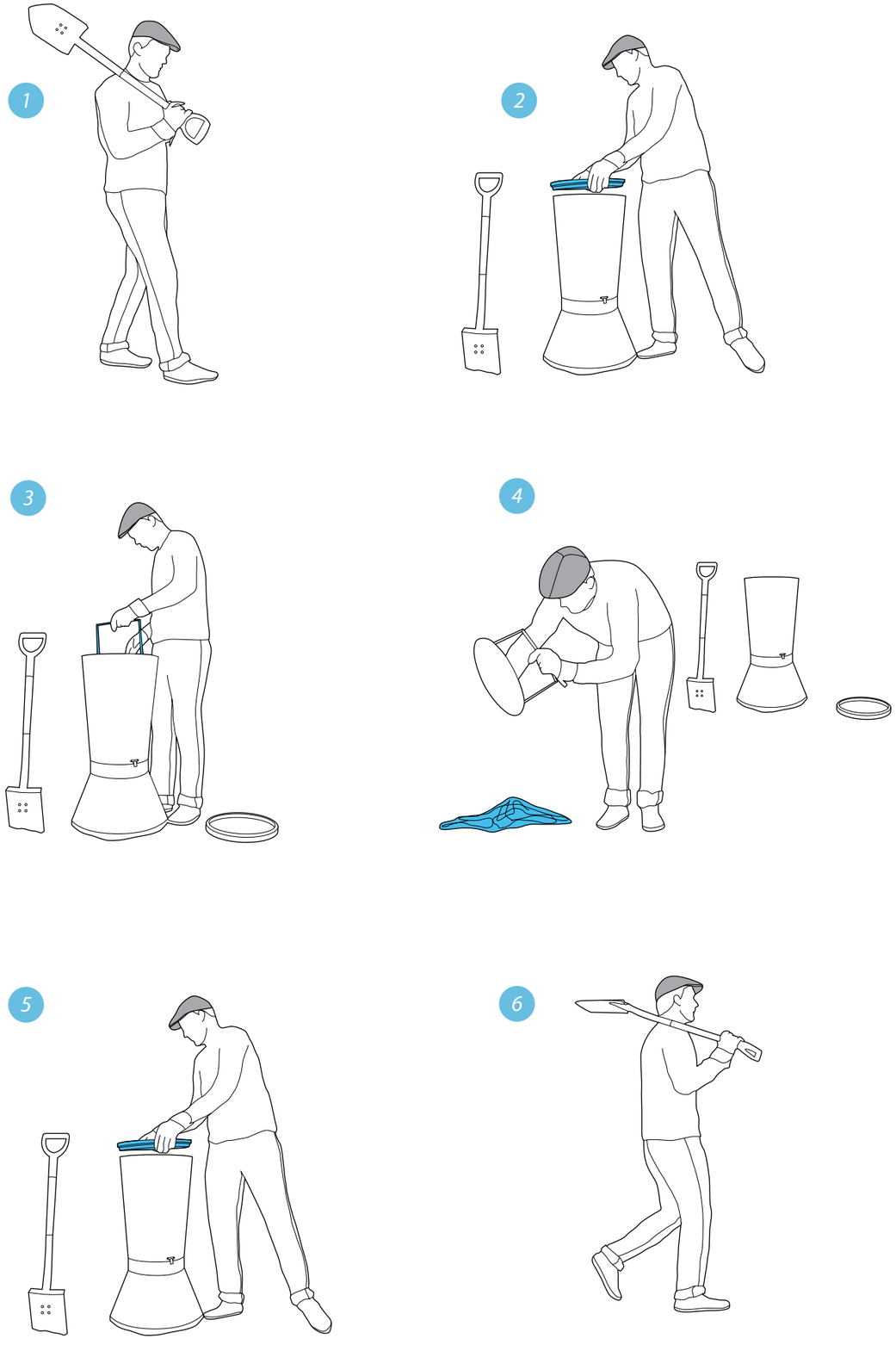
2. Remove the concrete lid from the module and place on the ground.

3. Lift the top plate with the help of the handle to remove the plant parts.

4. Remove the old plant material at a desirable location.

5. Insert the top plate and new plant material before the concrete lid is replaced on the top.

6. The maintenance is done and the farmer could leave the area.



MAINTENANCE OF WOODEN MATERIAL

Every third year maintenance of the wooden material has to be carried out to provide the insects with decent habitats. Old material has to be replaced with new material. This could be managed by the farmers in a simple way. This is described in the graphics to the right.

1. Arrive to the area where the module is placed.

2. Remove the concrete lid from the module and place on the ground.

3. Remove the old plant material, as shown before, at a desirable location.

4. Remove the top part from the bottom part by first unlocking the eccentric locks and then lift the top part by using the handles.

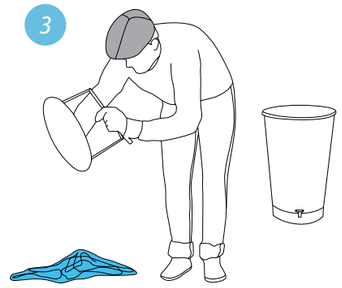
5. Transported the top part with tractor or by hand to a desirable location where the old wooden material could be placed.

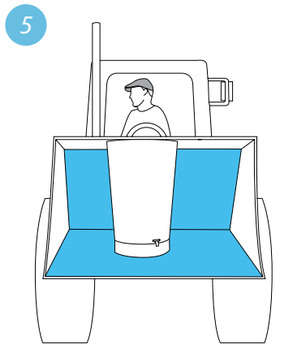
6. The top part could be emptied by turning it upside down with the help of the handles.

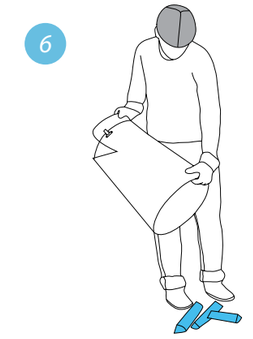
7. Bring the mobile top part back to the stationary bottom part and attach them to each other with help of the eccentric locks.

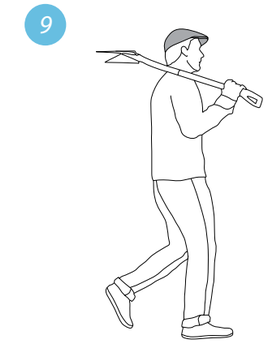
8. Insert new wooden and plant material before the concrete lid is replaced on the top.

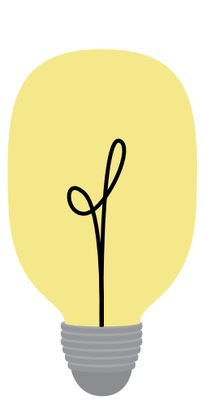
9. The maintenance is done and the farmer could leave the area.

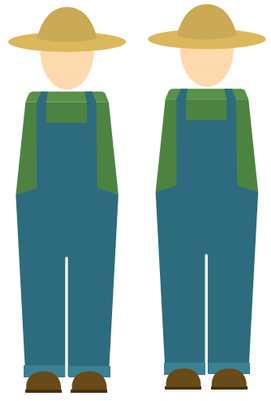


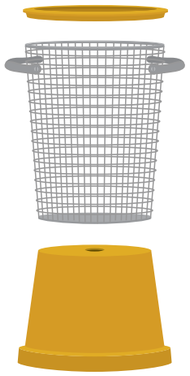


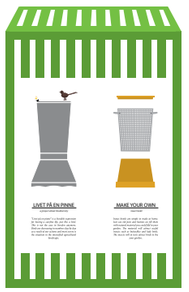












IMPLEMENTATION

One important choice to make, when introducing a new product on the market, is the implementation. In this case it was important to spread information that was clearly stated, to minimize the risk of misunderstanding. The design of the product, such as the shape and perforation, had been created with consideration of this and could hopefully guide the farmers partly.

It was also important to reach out to the intended target gruop, the farmers. In the research it showed that the most common ways for the farmers to get new information was through project consultancy, farmer cooperations, magazines and internet. With the help of these medias information about the project could be spread in an efficient way.

If integrated to the existing project consultancy no extra resources has to be used. The product could be presented as a possible improvement to the farm and the usage could be clearly stated to minimize the risk of misunderstandings.

By getting a few farmers to try out the product, and if the result is good, the information will automatically be spread between the farmers through cooperations. Just like other improvements has done.

To publish the product in magazines and internet is an efficient compliment to the project consultancy and farmer cooperations.

By trying to create a low cost product the chance of getting organisations and governments to sponsor farmers with the product will increase. If this is managed the effort needed by the farmer will be reduced and thereby the chance of getting the product into use increase.

If the use of the product will increase the possibility of home made copies will also grow. This would be a positive effect that could create an even more sustainable solution to the problem.

By trying to create a fairly simple product with similarity to other existing products this behaviour could hopefully be facilitated.

To encourage the farmers to improve their farm towards a more sustainable agriculture acknowledgement could be used. This could be gained by informing the public about the effort made by the farmers when placing the product on their farm. One simple way to do this in Sweden could be to put information on the back of a milk package. When people becomes familiar with the concept the product could be recognized on the fields and become more of an advertisement for the farm.

WHAT WILL THE FARMER GAIN?

If only 0,2 m^2 could be spared on a farm this module could be integrated and an increased biodiversity could be gained. The more square meters spared the more increased biodiversity.

Rest materials existing on the farm could get another use. Stones that are removed from the fields, wood materials that are left after felling and autumn leaves that are covering the lawn could create important habitats for insects. By placing the stone, wood and plant material into the module, designed to take advantages of the material, insects that is important for the farm could be supported. Ecosystem services such as pollination and pest control will increase just as the biodiversity. The insects will also provide agricultural birds with food and prevent them from becoming extinct. The birds will in turn keep the insect, vole and mouse population in a normal level. They will also benefit the farmer with bird songs and other aesthetical values that is impossible to put a price on.

The insects and birds are just a small parts of the complex ecosystem but still as important. By supporting them the rest of the system will also benefit.

By placing this module within the landscape the farmers will show the surrounding that they are one of those who cares about the environment and our future. Hopefully this product could also inspire them to make more improvements to their farm.

MODEL

DETAILS

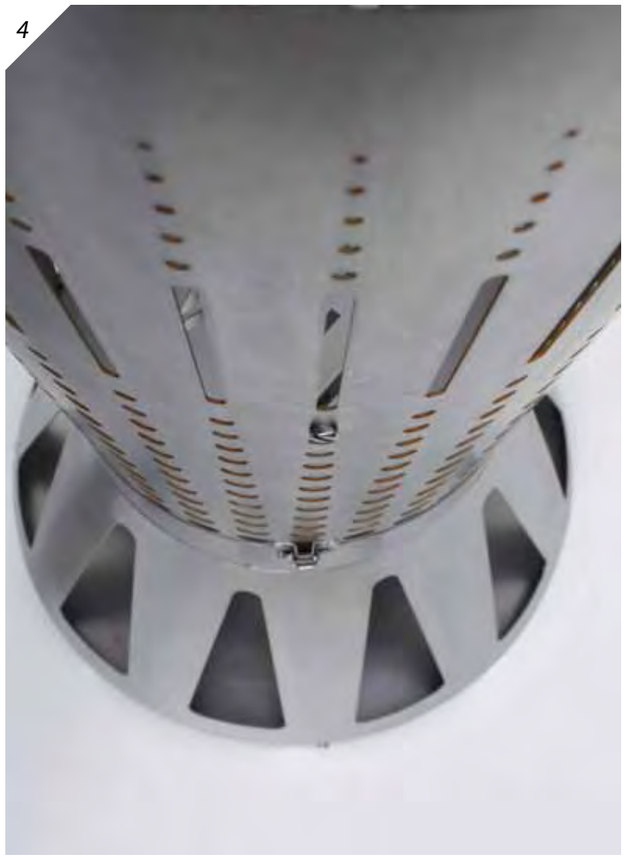
1. Top plate
2. Middle plate
3. bottom plate
4. Screw and eccentric lock
5. Handle
6. Lid

1

2

3

4



5

6

DISCUSSION

presenting personal thoughts around the project

CONCLUSION

This project started with an interest. An interest that has followed me through years and that has, during time, grown into a fascination. A fascination for nature, a system that constantly surprises me with its complexity and beauty.

The fact that we are destroying it day by day makes me feel uneasy. My goal as a person and designer is to prevent this trend from continuing and therefor I chose a project where I could make a change.

With a brave vision in mind I started the project of saving the agricultural birds from extinction. I knew that this would be a complex problem to solve but I still underestimated it. In nature everything is connected and even the smallest change could have dramatic consequences. Therefor the end result had to be carefully thought through.

By contacting knowledgeable people within the field this was possible to manage. With their knowledge and my creativity something new was possible to create.

I am very grateful to have gotten the possibility to work with a project that really interests me both as a person and designer. Because of my interest in the subject and the knowledge, that I could make a change, has kept me motivated during the whole process. This has definitely effected the end result in a positive way.

During the process I have found a way of working that I feel suits me. Two methods that especially has shown to be of importance within my process is the meetings and the idea generation.

In the research phase I integrated field trips and interviews where I met many inspiring and knowledgeable people. This didn't only give me gained knowledge but also a better understanding for the subject which has been of importance in the project. These meetings has also established many valuable contacts for the future.

The other method I used frequently during the process is the idea generation. I feel that this is my strongest skill as a designer and by using it as a tool I have been able to bring the project forward even during the toughest periods. This is something I will definitely use in future projects.

Even if the process has looked similar to previous projects I done there is one big difference and that is loosing control. I like to be in time and preferable ahead of time within all projects. After working with my master project for 15 out of 20 weeks and having a product ready to produce I reached a point where everything changed. Just by a simple question "Is this really the simplest solution to the problem?" everything changed. With five weeks left a new concept generation started and the process was repeated once again but this time in a much higher speed. The timetable was long gone and the feeling of loosing control stressed me out. To get back on track an even more strict working schedule was applied and the decisions making had to be fast. With these simple methods the project could still be managed in time with an even more desirable end result.

To put myself in the situation of loosing control, which was really uncomfortable for me, has definitely made me stronger. Today I know that I can manage these kind of situations and that loosing control actually could turn into something positive.

During my five years of education I have grown both as a person and designer. This project has been a summary of these years and the knowledge I gained. It has also given me many new insight that will be useful for my future career as a designer. When I am now, five years later, leaving school I believe in myself and my skills in a completely different way. I think that I could make a change as a designer.

THE FUTURE

During this project I have got in contact with many people interested in my work. Not designers but actually biologists, agronomists, ornithologists and farmers, which makes me far happier.

My contact with Bengt Hellerström has given me the opportunity to actually test my product on his farm. Hopefully this will show what kind of improvements that could be done to the product to reach an even better result.

Another important contact I got was David Ståhlberg, who is running "Vindkraft i slättlandskapet". He has given me the opportunity to present my project and findings in their magazine *Hävdat* which goes out to the farmers in Sweden. He has also invited me to consultancy activities to present my work. This makes me even prouder of my project.

I am happy to have gotten the possibility to show them another side of design that i know they didn't expect when they first met me. Because when I have been presenting the theme of my project their first reactions have always been: What has design to do with this? I hope that I have proven that design is of importance even within a field like this.

My hope is that with the opportunities given from my contacts the goal of this project will be reached. That this could rise a discussion around the issue and engage more people to take action towards a more sustainable future.

REFERENCES

compiling references from the research

LITTERATURE REFERENCES

1. Naturvårdsverket(2010) Konventionen om biologisk
mångfald och svensk naturvård. [pdf] Stockholm: Naturvårdsverket. Available at: <http//: naturvardsverket.se> [accessed 12.01.07]

2. Artdatabanken, 2010. Rödlistade arter i Sverige. [online] Available at: <http://www.artfakta.se/GetSpecies.aspx?SearchType=Advanced> [Accessed 11.12.10]

3. WWF, 2010. Fåglar i Sverige. [online] Available at: <http://www.wwf.se/vrt-arbete/arter/1125997-fglar-i-sverige> [Accessed 11.11.20].

4. Skogsstyrelsen, 2010. Vem äger skogen? Available at: <http://www.skogsstyrelsen.se/Upptack-skogen/Skog-i-Sverige/Fakta-om-skogen/Vem-ager-skogen/> [Accessed 12.01.12].

5. Wikipedia, 2012. Birds. Available at: <http://en.wikipedia.org/wiki/Bird> [Accessed 12.01.09].

6. Nationalencyklopedin(2012) Jordbrukets historia: Svenskt jordbruk eftere andra världskriget. Stockholm: Natrionalencyklopedin. Available at: <http://www.ne.se/rep/jordbrukshistoria-svenskt-jordbruk-efter-andra-världskriget> [accessed 12.01.10]

7. Jordbruksverket, 2011. Sveriges jordbruk i siffror. Available at: <http://www.sjv.se/amnesomraden/konsument/sverigesjordbrukisiffror.4.4ef62786124a59a20bf800076016.html> [Accessed 12.01.13].

8. Lunds universitet, 2011. Intensifiering av jordbruket hotar den biologiska mångfalden. Available at: <http://www.lu.se/o.o.i.s/27764> [Accessed 12.01.13].

9. Jordbruksverket 2011. Miljöersättningar. [online] Available at: <http://www.sjv.se/jordbruksverketslattlastasidor/stodtilllandsbygden/miljoersattningar.4.795c224d1274198ffc280003136.html> [Accessed 11.12.13]

10. Naturskyddsföreningen 2010. Biologisk mångfald. Available at: <http://www.naturskyddsforeningen.se/natur-och-miljo/jordbruk-och-mat/jordbrukets-miljopaverkan/biologisk-mangfald/> [Accessed 11.12.13]

11. Länsstyrelsen Norrbotten 2010. Jordbruksmark. Available at: <http://www.lansstyrelsen.se/norrbotten/Sv/miljo-och-klimat/tillstandet-i-miljon/jordbruksmark/Pages/default.aspx> [Accessed 11.12.13]

12. IFOAM, 2011. *Definition of Organic Agriculture*. Available at: < http://www.ifoam.org/growing_organic/definitions/doa/index.html > [Accessed 12.01.15]

13. Ekologiska lantbrukarna Jämtland Härjedalen, 2010. *Ekologiskt jordbruk*. Available at: <http://www.eljh.se/ekologisktjordbruk1.html> [Accessed 12.01.15]

14. 350, 2010. *Nödvändigheten av ett ekologiskt och hållbart jordbruk*. Available at: <http://world.350.org/sverige/2010/11/07/nodvandigheten-av-ett-ekologiskt-och-hallbart-jordbruk/> [Accessed 12.01.15]

15. Naturvårdsverket 2010. *Tillämpning fåglar i jordbruket.* [online] Available at: < http://www.naturvardsverket.se/upload/handbok/Bil21-faglar-jordbruket.pdf > [Accessed 11.12.13]

16. Jordbruksverket 2011. *Miljöersättningar*. [online] Available at: <http://www.sjv.se/jordbruksverketslattlastasidor/stodtilllandsbygden/miljoersattningar.4.795c224d1274198ffc280003136.html> [Accessed 11.12.13]

17. SOF 2011. *Välkommen till SOF.* Available at: <http://www.sofnet.org/> [Accessed 12.01.16]

18. SOF 2011. *Lantbrukare och fågelskådare.* Available at: <http://www.sofnet.org/sveriges-ornitologiska-forening/fagelskydd/jordbruksprojektet/> [Accessed 12.01.16]

19. Jordbruksverket 2010. *Projektbeskrivning för Mångfald på slätten.* [online] Available at: <http://www.jordbruksverket.se/download/18.32b12c7f12940112a7c80004831/Mångfald+på+slätten+projektbeskrivning.pdf> [Accessed 12.01.16]

20. Miljömål 2010. *Fördjupning - Häckande fåglar i odlingslandskapet.* Available at: <http://www.miljomal.se/Systemsidor/Indikatorsida/Fordjupning/?iid=65&pl=1&t=Land&l=SE> [Accessed 12.01.16]

21. Paulsson, P. , 2011. Norra Skåne, Newspaper, [online] Available at:<http://www.nsk.se/article/20111003/KRISTIANSTAD/710039717/1132/-/man-missar-ju-allt-som-ar-utom-horhall> [Accessed 22 June 2009].

22. Handbok för vardags ekologi , 2011. *Biologisk bekämpning.* Available at:<http://www.alternativ.nu/handbok/odling/biobekampning.html> [Accessed 22 June 2009]

23.Jordbruksverket 2011. *Vindkraft i slättlandskapet.* [online] Available at: <http://www2.jordbruksverket.se/webdav/files/SJV/trycksaker/Pdf_ovrigt/ovr3_30.pdf> [Accessed 12.01.31]

24.Wikipedia 2011. *Insect hotel.* Available at: < http://en.wikipedia.org/wiki/Insect_hotel > [Accessed 26.02.18]

25.RSPB 2011. *Birds and water.* Available at: <http://www.rspb.org.uk/advice/helpingbirds/water/> [Accessed 12.02.08]

PICTURE REFERENCES

Page 15:

Nilsson, P, 2010 *Ringmärkning på Haparanda sandskär.*

Page 18-19:

Laiho, U, 2010 Fållnäs gård. [electronic print] Available at: < http://3.bp.blogspot.com/_Xg8SM6qAbe0/THUMcKcbbeI/AAAAAAAAACic/d_T_hFNFuD8/s1600/6IMG_4273+2010-06-04.JPG> [Accessed 11.12.12]

Page 23:

Månsson, P, 2010 *Gulärla.* [electronic print] Available at: <http://www.uof.nu/uppfoto/2010/2/gularla_PM.jpg> [Accessed 12.01.09]

Page 27:

Yophotographer, 2010 *Great tit.* Available at: <http://www.dejavuphoto.net/Photographs/Birds/Lochwinnoch-RSPB-16th-December-09/Great%20tit2.jpg> [Accessed 12.01.20]

Page 33:

Figure 1. Artdatabanken, 2010. *Rödlistade arter i Sverige.* [online] Available at: <http://www.artfakta.se/GetSpecies.aspx?SearchType=Advanced> [Accessed 11.12.10]

Page 34:

Page 34: Rahil, B, *Hoopoe* [electronic print] Available at: <http://www.pbase.com/abdulghani/image/116045415/original.jpg> [Accessed 12.01.09]

Webster, B, *Great Bustard* [electronic print] Available at: <http://passionforbirding.com/communities/5/004/008/240/525/images/4537066197.jpg> [Accessed 12.01.09]

Li, A, *European Roller* [electronic print] Available at: <http://media.photobucket.com/image/european%20roller/andy-00_album/Xinjiang/EuropeanRoller-a.jpg> [Accessed 12.01.11]

Page 35:

Jindra, J, *Middle Spotted Woodpecker* [electronic print] Available at: <http://www.biolib.cz/IMG/GAL/BIG/76830.jpg> [Accessed 12.01.11]

Walker, L, *White Stork* [electronic print] Available at: <http://www.marksukwildlifephotos.com/USERIMAGES/stork2.jpg> [Accessed 12.01.11]

Page 36:

May, R, 2008. *Barn owl.* [electronic print] Available at: <http://rogermay1.com/page5.htmG> [Accessed 12.01.09]

Oscarsson, S, *Rödspov* [electronic print] Available at: <http://www.naturfotoforum.se/black.php?bild=http://www.osqar.se/Foton/Sverige/Rodspov_15500_S.jpg&copyright=Oscar> [Accessed 12.01.09]

Page 37:

Hall, B, *Lesser White-fronted Goose* [electronic print] Available at:<http://www.birdlife.org/images/raw/lesser_white_fronted_goose_ben_hall_rspbimages_com.jpg> [Accessed 12.01.09]

Page 38-39:

Respenda, M, 2011 *Farm.* Available at: <http://farm3.static.flickr.com/2765/5731030290_bea220518b_o.jpg> [Accessed 12.01.20]

Page 42-43:

Nature desktop, 2008 *Robin on bird table.* [electronic print] Available at: <http://www.natures-desktop.com/images/wallpapers/1280x1024/birds/robin-on-birdtable.jpg> [Accessed 12.01.09]

Page 44-45:

Bilder Allting Gratis, 2010 *Bakgrundsbild Sjungande fågel.* [electronic print] Available at: <http://bilder.alltinggratis.se/big/1181.jpg> [Accessed 12.01.09]

Page 66-67:

Ståhlberg, D, 2010, *Kreotop.*

Page 70:

Paul, 2010 *Heatwave in Kazakhstan.* Available at: <http://www.landysadventures.com/wp-content/uploads/2010/06/2010-06-26-Kazakhstan-watering-hole-in-desert-1.JPG> [Accessed 12.02.10]

Strzelecki, J, 1996 *Tree and zebras.* Available at: <http://upload.wikimedia.org/wikipedia/commons/2/28/Savanna_tree%28js%29.jpg> [Accessed 12.02.10]

Omar,F, 2010 *Coral Reef in Pulau Sipadan.* Available at: <http://static.panoramio.com/photos/original/16963286.jpg>[Accessed 12.02.10]

Page 71:

Wallpapersonweb, 2011 *Wedge tailed eagle.* Available at: <http://www.btwallpapers.com/wp-content/gallery/animals-insects/wedge-tailed-eagle-1680x1050.jpg>[Accessed 12.02.10]

Gdefon, 2010. Available at: <http://www.gdefon.ru/download/zhivotnye_gepard_savanna_afrika_zakat/183535/1920x1200>[Accessed 12.02.10]

Page 77:

Nilsson, P, 2010 *Buskskvätta.*

Page 84-85:

Transblawg, 2011. Available at: <http://www.transblawg.eu/uploads/animals/P1000802a.JPG>[Accessed 12.03.07]

Page 98-99:

Paul, 2010 *Heatwave in Kazakhstan.* Available at: <http://www.landysadventures.com/wp-content/uploads/2010/06/2010-06-26-Kazakhstan-watering-hole-in-desert-1.JPG> [Accessed 12.02.10]

Page 100-101:

Louie, K, 2011 *A little dip.* [electronic print] Available at: <http://farm4.static.flickr.com/3172/2652518869_778b0deb03_o.jpg> [Accessed 12.02.13]

Page 161:

Texas welding, 2011 *Welding.* [electronic print] Available at: < http://www.sambellwelding.com/welding.jpg > [Accessed 12.05.27]

APPENDIX

compiling additional research

APPENDIX 1.1 - FACT SHEET

SAMARBETE FÖR JORDBRUKSFÅGLAR

Tornfalk

Namnet tornfalk kommer av att den förr ofta använde kyrktorn som häckningsplats, och den har även kallats för ”kyrkofalk” av Linnè. Med sin fantastiska syn upptäcker den sitt byte från hög höjd. Foton: John Larsen.

Eftersom tornfalken jagar sork och möss är den en av bondens bästa vänner. Tornfalken drabbades hårt av biocidanvändningen på 1950- och 1960-talen och minskade kraftigt i främst Syd- och Mellansverige. Därefter har beståndet återhämtat sig och nästan fördubblats under de senaste tre decennierna. Flest par häckar i Norrland, då ofta på större hyggen.

Tornfalken behöver:

Öppna landskap

Tornfalken trivs bäst i öppna och varierade jordbrukslandskap. Hemområdet uppgår till någon kvadratkilometer eller mer, beroende på tillgången på föda. Falken ses ofta ryttlande, ett jaktsätt som passar bra i öppna landskap. Jaktmarkerna är oftast vallar, trädor, betesmarker och andra gräsbärande marker.

Rikligt med gnagare

Födan består mestadels av sorkar och möss, vanligast är åkersork. En vuxen falk kan äta fyra till åtta sorkar per dag! År med dålig gnagarförekomst utgör insekter och ödlor en viktig del av födan. En del av födan utgörs också av fåglar och fågelungar, exempelvis sånglärke- och tofsvipeungar.

Lämpliga bohål

Tornfalken bygger inget eget bo, utan använder vanligtvis gamla kråkbon. Häckning sker även i höga byggnader eller på klipphyllor. Speciella tornfalksholkar är omtyckta, och har sannolikt varit av stor betydelse för den kraftiga ökningen under senare år. Holkarna ger ungarna ett bättre skydd mot boplundrare.

Mars	April	Maj	Juni	Juli	Augusti	September
Kommer tillbaka från Syd- och Västeuropa. En del fåglar övervintrar i södra Sverige.		Häckningsperiod i södra Sverige.		Ungfåglarna blir mer och mer självständiga.		Flytten söderut påbörjas.

SAMARBETE FÖR JORDBRUKSFÅGLAR

Tornfalk

Tornfalkar kan hjälpas genom att upp särskilda holkar. Var dock försiktig med att sätta upp holkar i områden med sällsynta fåglar, t.ex. nära strandängar, då vadarfåglarnas ungar riskerar att hamna på falkens meny.

Tornfalkar gillar stora holkar med stor rektangulär öppning. Holkens mått bör vara: Bredd: 40 cm; djup: 40 cm; höjd: 40 cm; öppning 40x20 cm; takbredd: 40 cm; takdjup: 50 cm (se www.sofnet.org).

Holkarna sätts lämpligen upp på laduväggen direkt under taknocken. Den kan även sättas upp på en stolpe eller i ett träd. Man bör komma ihåg att falken vill ha fri sikt framför sitt bo, helst ett öppet fält. Tänk på att inte sätta holkar mot SV (vanligaste vindriktningen) då det lätt regnar in i dem. Undvik också solexponerade lägen. Botten kan fodras med ett 5 cm tjockt lager av såg- eller kutterspån. Foto: Sören Eriksson.

HOT:

De största hoten i slättbygder är en minskad födotillgång och boplatsbrist till följd av:

- En lägre andel vall och betesmarker minskar mängden sork i landskapet.
- Allt färre lämpliga byggnader och boträd.

ÅTGÄRDER:

En viktig åtgärd är att öka andelen gräsmarker i slättlandskapet.

Boplatser:

- Bevara gamla lador ute på fälten.
- Sätt upp tornfalksholkar på höga byggnader, på stolpar eller i lämpliga träd ute på någon åkerholme. Hör gärna med en lokal fågelklubb om de har något holkprojekt på gång i trakten.
- Låt gamla träd stå kvar på åkerholmar.

Föda:

- Lägg blöta marker i träda, gärna långliggande, så att en gräsvegetation bildas. Låt det bildas gammal förna på marken vilket gynnar djurlivet.
- Öka andelen permanenta gräsmarker och vallar ute på slätterna.
- Anlägg gärna breda skyddszoner längs vattendrag och diken.
- Lägg inte igen öppna diken. Skapa breda dikesrenar.

Fågelskådare och lantbrukare i samarbete - kommunikation och naturvård i jordbrukslandskapet. © Eggers, S., Eriksson, S., & Haldén, P. (2009) Sveriges Ornitologiska Förening (SOF) och Hushållningssällskapet (HS).

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APPENDIX 1.2 - CONCULTANCY MEETING

Inventerade fåglar på jordbruksmark – Waldebring 2011

Art	Förkortning	Trend (30 år)	Status	Lövgården	Par/revir 2008	par/revir 2011
Ängshök	ÄH	↓	sårbar	Nej		
Tornfalk	TO	↑	livskraftig	Nej	1	0
Rapphöna	RA	↓	missgynnad	Nej		
Vaktel	VA	↑	missgynnad	Nej		
Kornknarr	KK	↑	sårbar	Nej		
Fasan	FN	↓	inplanterad	Ja	4	3
Tofsvipa	TV	↓	livskraftig	Ja	2	3
Storspov	SP	↓	missgynnad	Nej		
Enkelbeckasin	EB	↓	livskraftig	Nej		
Sånglärka	SL	↓	missgynnad	Ja	3	7
Ladusvala	LS	→	livskraftig	Nej	2 ex	0
Hussvala	HS	↓	livskraftig	Nej		
Ängspiplärka	ÄP	→	livskraftig	Nej	4	0
Sädesärla	SÄ	↓	livskraftig	Ja		1 ex
Gulärla (sydlig)	GÄ	↓	sårbar	Nej	1	0
Näktergal	NÄ	↓	livskraftig	Nej		
Stenskvätta	ST	↓	livskraftig	Ja	5	3
Buskskvätta	BU	↓	livskraftig	Ja	4	1
Gräshoppsångare	GS	↓	missgynnad	Ja	0	1
Törnsångare	TÖ	→	livskraftig	Ja	0	3
Törnskata	TS	↓	livskraftig	Nej	1	
Stare	SE	↓	livskraftig	Ja	17 ex	1 par + 1 ex
Gråsparv	GP	↓	livskraftig	Ja	4 ex	1
Pilfink	PK	↓	livskraftig	Ja	5 ex	1
Hämpling	HÄ	↓	missgynnad	Ja		2
Steglits	SG	↑	livskraftig	Nej	1	0
Ortolansparv	OV	↓	sårbar	Nej		
Gulsparv	GV	↓	livskraftig	Ja	0	3
Kornsparv	KV	↓	starkt hotad	Nej		

Totalt antal observerade arter: 13 av 29 möjliga (andel 45 %). Antal arter 2008: 14.

Röd = arten är med på Artdatabankens rödlista över hotade arter

Fågelskådare och Lantbrukare i samarbete

Dokumentation av rådgivningsbesök 1

Besöksdatum:
2009-02-20

Börje Waldebring
Vansö Lövgården 1
645 92 Strängnäs
0152-201 17

Inventerare 2008:
Ture Persson tfn 0152-20012

Rådgivare: Petter Haldén
Hushållningssällskapet tfn: 0703/38 55 58

GÅRDSBESKRIVNING

Börje brukar ca 250 ha inom det gamla övningsfältet på Vansö. Landskapet är delvis småbrutet men har också slättkaraktär. Gott om åkerholmar med äldre lövträd på finns och i sydost vetter marken ned mot en igenväxande Mälarvik. Mer och mer av det gamla övningsområdet bryts upp från långliggande gräsmarker till spannmålsodling. Höstvete är huvudgrödan och ambitionen är att försöka så så mycket hvete som möjligt. Andra grödor betraktas i allmänhet som förfrukter till höstvetet. Förutom höstraps är dessa lin, vall, träda, maltkorn och grynhavre. Fram till för helt nyligen fanns ett hundratal köttdjur som betade i trakten men dessa har slaktats ut och idag finns inga betande djur. Detta har också inneburit att vallodlingen förstås också upphört. Börje är jakt- och rovdjursexpert på LRF och har ett stort intresse för viltvård. Som ett led i detta har Börje anlagt ett antal vilt- och fågelåkrar på delar av den före detta betesmarken. Genom att inte söka stöd för dessa kan Börje odla vad han vill och göra de åtgärder som han vill. Exempel på åtgärder är att tröska delar av grödan på sommaren och spara resten för att skapa gångar. Annat är att harva upp bar jord för fåglar att födosöka på. Träd och buskar runt viltåkrarna putsas ned till ca 3 m höjd för att erbjuda skydd och bli mindre attraktiva för kråkfåglar att sitta i. Grödor som odlas på viltåkrarna är t.ex. solros, majs, senap och klöver.

Observerade fågelarter

Av de 29 jordbruksanknutna fågelarter som ingår i inventeringen har 14 observerats på din gård vid de tre besök som gjorts. Se lista som är bifogad kartan. Av dessa placerar tre arter; sånglärka, ängspiplärka och tofsvipa regelbundet sina bon i själva fälten. Av de 14 arterna är det tre som är upptagna på den nationella rödlistan vilket innebär att det är arter som har minskat kraftigt i antal i Sverige under senare tid. Dessa tre arter är sånglärka, stenskvätta och törnskata.

Sånglärkan har minskat med nära 70 % i Sverige sedan 1970-talet. Orsakerna till det är den allmänna intensifieringen av jordbruket med ökad höstsådd, intensivare vallskötsel och färre odlade grödor. Uppdelningen i djur- och spannmålsgårdar inverkar förmodligen också. Höstsäd är tätare och högre än vårsäd och är därmed sämre som häckningsmiljö. Intensivare vallskötsel innebär bl.a. tätare intervall mellan skördarna vilket innebär att lärkorna inte hinner få ut ungarna mellan första och andra skörd. Sånglärkan behöver ca 35 dagar mellan äggläggning och det att ungarna kan flyga. Att det blir färre odlade grödor innebär att mängden tillgänglig föda minskar. Med en mångfald även bland grödor finns det alltid något under säsongen som passar med avseende på olika grödors utveckling. Sånglärkan är dock ännu den vanligaste markhäckande fågeln i öppna åkerlandskap. På din gård har det noterats 3 revir. Karakteristiskt för sånglärka är att den häckar långt från höga träd, hos dig ser man på kartan tydligt att den väljer fält i öppet läge en bit från gårdscentrum. Om du skall göra åtgärder för sånglärkan är det alltså där den observerades vid inventeringen som det har störst effekt.

Törnskatan gillar buskar att sitta och spana byten ifrån. Finns det taggbuskar som slån och nypon så kan man i törnskatans revir ofta hitta näbbmöss, stora skalbaggar eller rentav småfåglar som blåmesar spetsade på buskarnas taggar. Detta är ”skafferier” för regniga dagar under häckningssäsongen.

En annan rödlistad art som du har på din gård är stenskvättan som noterades med fem par vid inventeringen. Antalet stenskvättor i Sverige anses ha halverats sedan 1975. Att den har minskat så kraftigt beror på att många steniga, lågproducerande betesmarker inte betas längre och att många småbiotoper, som stenrösen, murar och lador i slättlandskapet har försvunnit. Med tanke på att betet nyligen upphört så är prognosen således dålig för stenskvättan hos er.

I dagsläget goda fågelmiljöer på din gård

Vilt- och fågelåkrarna
Till skillnad från vanliga fågelåkrar där grödan lämnas obärgad och på så sätt skall hjälpa fåglarna vintertid så gör du också en hel del insatser för att skapa bra häckningsmiljöer. Bravo!

Rådgivningen finansieras gemensamt av EU och Svenska staten.

Möjligheter till förbättringar

Du gör redan mycket för fåglarna och jag har inte mycket nytt att komma med men några förslag har jag i alla fall. O du vill diskutera något hoppas jag att du inte tvekar att ringa mig.

Skyddszoner

Det är bra att ta skörd på skyddszonerna så att inte förnaskiktet blir så tjockt. Förnan gödslar gräset så att vegetationen blir tätare och tätare vilket gör det svårt för både småfåglar och fälthöns att röra sig där. Skörd är tillåten först 15/7 vilket ger ett foder som inte är särskilt smakligt om jag förstår saken rätt. Ett alternativ då är att putsa med slaghack och vinkla röret in mot intilliggande gröda. På så sätt blir man av med förnan och förhoppningsvis också med en del av sorkarna.

Lärkrutor

Många höstvetefält är idag för täta (högproducerande!) för att sånglärkan (den absolut vanligaste i spannmålsfält) skall trivas. Det blir svårt för sånglärkan att ta sig fram på marken, ogräs som ger insekter sprutas bort, grödan är för hög osv. För att hjälpa sånglärkan kan man anlägga s.k. lärkrutor som är osådda rutor i spannmålsfält. De skall vara 15-20 m^2 stora och skapas genom att såbillarna lyfts upp ca 4-5 m. Är din såmaskin 3-5 m så blir rutorna lagom stora. Rutorna används för födosök och inte för häckning men indikationer finns på att lärkorna gärna lägger boet nära rutorna men inte i desamma. De fält som är lämpade för lärkrutor ligger i öppet läge utan höga träd i närheten. Höga träd används av kråkor och rovfåglar att spana ifrån och sånglärkor undviker dessa fält. Lägg inte lärkrutorna i sprutspåren eftersom dessa används av grävling och räv för att förflytta sig över fälten. Undvik även att lägga lärkrutorna inom 25 m från fältkanten eftersom de där löper högre predationsrisk av grävling och räv. Du kan ogräsbekämpa fältet inkl. rutorna som vanligt, det är t.o.m. en fördel att det görs eftersom det är bar mark som vi vill skapa. I rutorna blir det förstås mer ogräs än på övriga delar av fältet men i längden blir det inget problem eftersom rutorna byter plats mellan åren. Jag skickar med ett engelskt informationsblad om lärkrutor. Jag kan verkligen rekommendera RSPB:s (The Royal Society for the Protection of Birds) hemsida om lantbrukets fåglar på http://www.rspb.org.uk/ourwork/farming/

RÅDGIVNINGSPLAN

Som vi kom överens om så återvänder vi om två-tre år och inventerar gården på nytt och diskuterar därefter med dig om de åtgärder som du har gjort har haft effekt på antalet arter och individer på din gård.

Petter Haldén, Hushållningssällskapet
0703/38 55 58

Rådgivningen finansieras gemensamt av EU och Svenska staten.

APPENDIX 1.3 - FIELD TRIP TO ALNARP

To get knowledge about what and how to grow useful plants for birds and insects in the agriculture landscape Urban Emanuelsson was contacted. He work as a professor at SLU in Alnarp at the CBM, centre for biodiversity, section. He is very engaged in how to facilitate our biodiversity and a great source of inspiration.

At the meeting a discussion regarding the project was held where maintenance was central. First, different types of irrigation system was discussed. Urban said that water is essential for biodiversity. Even plants that grow outside and get rainwater now and then are in need to be watered. Rainwater is the best water for plants so by create irrigation systems with rainwater you could create a self driven garden.

Urban had some advices for how to reduce the maintenance when it comes to seeding and weed control. When it comes to small areas it is important to choose plants that are competitive to keep away the weed. Another suggestion was to use soil which are poor in nutrients such as sand and especially lime gravel which also is high in pH. The plants that like this kind of conditions are often perennial and dry tolerant. The lime gravel is unfortunately not as suitable in the farming landscape as in other areas. The advice was rather to use local plants with nectars and seeds. Red clovers was mentioned as an example of plants with nectars and low maintenance. Sunflower is rich in seeds and easy to grow but also just an annual plant. Urban suggested to use a mix of annual plants and perennial when planning for a future garden. To use bushes was another suggestion which are low in maintenance and could support insect with nectars and birds with berries and shelter. To make a bigger impact Urban suggested to work with plants because they are more rare in the farming landscape but also trickier to integrate.

Urban also thought that the use of pollinating insects are important in the area. Creating habitat such as insect hotel or sand piles and support them with nectar and water is essential. To keep all these necessities in close connection could facilitate for many insects.