

NATURE^SQUARED'S SPATIAL NATURAL CAPITAL ACCOUNTING APPROACH

Abstract

In this case study, Nature^Squared demonstrates their Spatial Natural Capital Accounting approach for (local and regional) governments, aimed at providing insight into the state of natural capital, inspiring relevant stakeholders towards alternative practices and delivering actionable policy recommendations. The framework has been extensively piloted and implemented with a Dutch launching customer: the Dutch province of Overijssel. Key results include:

- Visual renderings of the state of natural capital for over 10 ecosystem services.
- 30+ best practises for five industries on how to use and benefit from natural capital in a more sustainable way.
- In depth analysis, for example: five municipalities have business parks that scored very poorly on green (<14% vegetation), leading to heat stress, poor water management and limited habitat opportunities for urban species. This insight has, consequently, been a reason for the administration of Overijssel to initiate a series of masterclasses for park managers about the benefits of greening
- Other insights of this study revealed the underuse of the ecosystem service natural pest regulation by farmers, underused potential of biomass by small and medium-sized enterprises (SMEs), and regions that are exposed to (too) high levels of recreation.

Natural Capital Accounting as a tool for tailor-made policy

Our approach applies natural capital accounting at a regional scale, which entails a spatial dimension. In addition, we put a strong emphasis on stakeholder engagement. This combination informs clients about the current state and future outlook of a region's resources. Furthermore, the framework highlights physical hotspot areas - where natural capital is either overused ("risks") or underused ("opportunities") - and provides inspiration and tangible tools for farmers and SMEs. This allows these agents to make informed decisions in how to use natural capital in a more sustainable way.

Nature^Squared has calculated Overijssel's natural capital stock for several sectors and has identified specific regions where certain sustainable practices will have the highest impact. This has allowed the regional administration of Overijssel to design more tailor-made nature, economic and agricultural policy. There was a focus on farmers and SMEs of specific sectors - including leisure and biomass processing - in the project because of their direct dependency and impact on natural capital. They can also serve as stewards of change when it comes to altering the way natural capital is being used. Many of this study's recommendations are now integrated in policy, and the first follow-up projects have been initiated by the administration of Overijssel.

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Methodology

The framework is closely linked to the Natural Capital Protocol: the internationally recognised framework that provides guidance in conducting a valuation study of natural capital. Our Spatial Natural Capital Accounting approach follows a structured step-by-step approach (see figure 1), in which the demand for and supply of natural capital is identified, and potential sustainable practices are proposed. By combining spatial data and scientific proxy values, maps with location-specific data can be obtained. For the province of Overijssel, we used 32 different GIS data layers to develop each map. Based on these maps, physical hotspots were identified where natural capital is either overused ('risks') or underused ('opportunities').

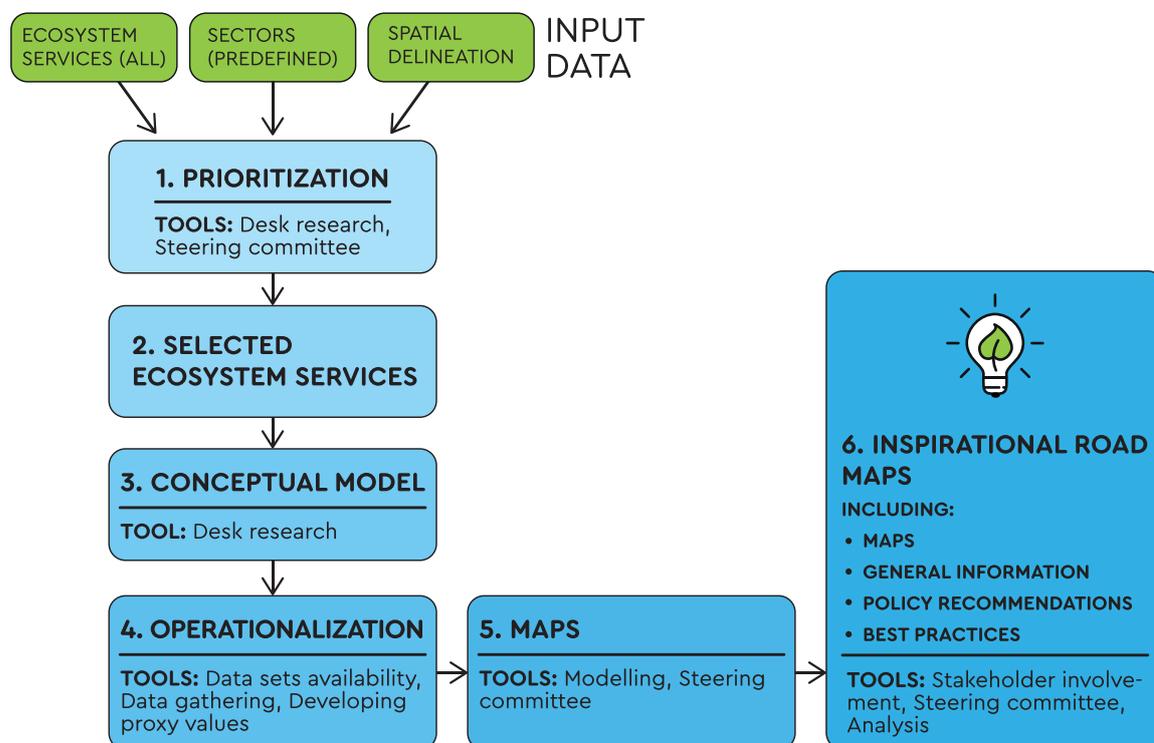


Figure 1: Spatial Natural Capital Framework

The main results were obtained through a combination of desk research, modelling, interviews with stakeholders, and workshops with industry representatives. These workshops covered an overview of the current situation, areas for improvement, and suggestions for alternative practices. Multiple feedback and consultation sessions with the steering committee formed an integral part of the process. Ultimately, all information collected was analysed and bundled together in inspirational road maps (see figure 3).

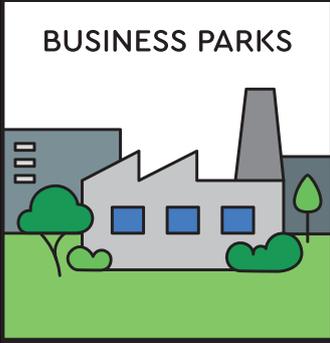
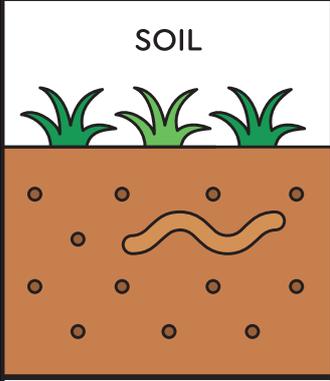
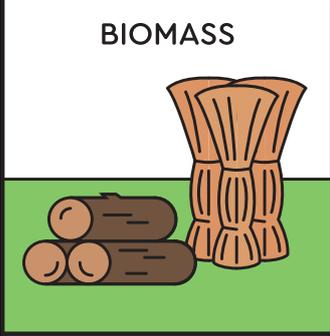
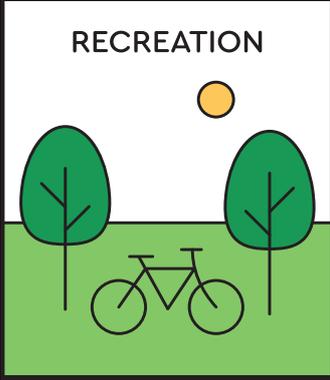
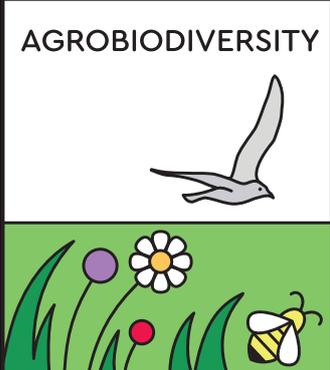
The customer

The province of Overijssel is a province in the east of the Netherlands, famous for its beautiful nature and diverse landscapes. It is characterized by a thriving tourism sector, modern business, and innovative agriculture with room for nature and recreation. Overijssel is 3,421 km² in size, has over 1.15 million inhabitants and consists of 25 municipalities. Almost 70% of the land is used for agriculture (CBS, 2015). In the renewal of its nature policy, the province of Overijssel has worked out a strategy in which the “utilisation, experience and protection” of nature is central. Nature^Squared was asked to calculate Overijssel’s most important natural capital stocks and identify alternative practises required to use these natural capital stocks in a more sustainable manner.

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RESULTS

OPPORTUNITIES FOR SUSTAINABLE PRACTICES

	RESULTS	OPPORTUNITIES FOR SUSTAINABLE PRACTICES
BUSINESS PARKS 	<ul style="list-style-type: none"> 5 municipalities have business parks of which half score poorly on green (less than 14% green) 7 urban areas have high levels of heat stress (temperature difference between urban and surrounding rural areas is between 1.2 – 2.0 °C) and low levels of green (less than 14%) 	<ul style="list-style-type: none"> Regreening business parks to mitigate heat stress, improve water retention, and create positive effects for HR. Practices range from green roofs to wadis, from planting trees to green facades.
SOIL 	<ul style="list-style-type: none"> 11 municipalities have areas that have a negative carbon balance of between -0.5 to 0 ton CO2 per year, i.e. more carbon is emitted than stored in the soil. Peat areas in the northwest of the province subside by as much as 15 millimetres a year due to peat oxidation, shrinkage and settling. 12 municipalities, mainly located in the centre and east of the province, have an annual precipitation deficit of more than 150 millimetres. 	<ul style="list-style-type: none"> Increasing organic matter content by e.g. using green fertilisers or bokashi, which promotes water retention of the soil. Projects can be set up to encourage farmers to increase organic matter, thereby storing more CO2 in the soil and mitigating climate change. Piloting with alternative agricultural practices in areas that are exposed to land subsidence by e.g. implementing underwater drains or switching to wet crops.
BIOMASS 	<ul style="list-style-type: none"> In 5 municipalities are forests situated that have an additional growth of woody biomass of 12,500 – 20,000 m3 per year. In 4 municipalities there is a potential harvest of 3 to more than 10 kilotons of dry matter per year from non-woody biomass (originating from small heaths, grass verges and reed vegetation). 	<ul style="list-style-type: none"> Facilitating and promoting the use of bio-based materials and supporting entrepreneurs herein, specifically in high potential municipalities.
RECREATION 	<ul style="list-style-type: none"> The municipalities that have the highest number of overnight stays simultaneously hold natural zones with the highest levels of biodiversity. SMEs in the recreation industry of these areas indicate that they know very little about this correlation and have few knowledge about their landscape and surroundings. Silence areas, where the noise level is lower than 45 dB and the light pollution at night is below 5 lux, can be found in the centre and the east of the province. These are all located in nature reserves. 	<ul style="list-style-type: none"> Promoting and training entrepreneurs in the recreation sector to inform their guests about biodiversity and the landscape in which they are located, and create a more eco-aware experience. Setting up paying for ecosystem services schemes to stimulate financing nature conservation by recreationists.
AGROBIODIVERSITY 	<ul style="list-style-type: none"> In the centre of the province are areas where pest-sensitive crops (potatoes, beets, grains, fruit and orchards) are grown, and where the overlap with pest-regulating zones is between 0 - 25%. Here farmers do not optimally benefit from natural pest control. With more than 40 different species, the species diversity of bees is highest in the municipalities in the centre and the east of the province. 	<ul style="list-style-type: none"> Setting up projects and informing farmers about natural pest control. This may include sowing field edges with flowers and adding landscape elements. Subsidies could support farmers to take the first steps.

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Results

The results were visualised in citymap style products covering five themes: business parks, agriculture (soil quality), biomass, recreation and agriculture (agro-biodiversity). Figure 2 summarises some of the key findings. An example of such a map can be found in figure 3.

Next Steps

The study was completed in October 2018. After a series of implementation workshops, the results were presented to the provincial Deputy of Agriculture and Nature. Several follow-up projects have been initiated by the province such as organising masterclasses for business parks owners, workshops for farmers about biodiversity-proof practices, and the coaching of industry forerunners in the recreation industry.

The design of the Spatial Natural Capital Accounting approach has been tested and is ready for rollout with other governments.

About Nature-Squared

Nature^Squared is a project-office based in Amsterdam with a sound track record of projects on biodiversity and natural capital. Nature^Squared sees the global and rapid decline in biodiversity as one of the biggest threats facing mankind. At the same, we believe increasing biodiversity and restoring ecosystems present a huge opportunity to deliver positive outcomes for business, society, and our planet. Nature^Squared's projects deliver positive impacts and sustainable outcomes. They take an integrated approach to sustainability, combining ecology with business sense, and a thorough understanding for the human factor driving change.

The following people were involved in realizing this project: Daan Groot (Director), Tom Kools (Project Manager), Kars Meijboom (Natural Capital Analyst), Lotte van Helden (Natural Capital Analyst), Iris Visser (Natural Capital Analyst) and Anastasia Angelovskaya (Communication).

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Figure 3: Inspirational map for business parks

BUSINESS PARKS

INTRODUCTION

Are you a business park manager and do you feel responsible for an attractive business park with a strong business case? Or are you an entrepreneur and do you, in addition to being involved in your environment, want employees who are satisfied and productive? Then consider greening your business park. Greenery on a business park increases the real estate value and also contributes to cooler sites in summer and more resistance to flooding. You can even save money. By investing in greenery on business parks, you will save on your energy bill and there may be reduced damage in the case of severe rainfall. It can also lead to fewer sick-leaves and a working environment that becomes more attractive for employees.

The map in front of you shows how "green" business parks are in the province of Overijssel. As an entrepreneur or manager, it offers you starting points on how you can get to work on greening. View the inspiring examples, read the points of attention and discover what green can offer you!

GREEN ADVANTAGES

More and more business parks are being greened. Greenery makes sites attractive for employees, customers and stakeholders. In addition, it has a positive effect on real estate and property value. By greening, the real estate value of a business park can increase up to 40% and the rent up to 7%.

Currently, the greenest business parks are located in Overijssel. In municipalities of Enschede, Enschede and Oude- en Nieuw-Doornik. Whoever looks at these sites in a more detailed way many times between the trees, along parking lots and roads, and lots of trees. Business parks in the municipalities of Enschede, Enschede and Oude- en Nieuw-Doornik currently score relatively low. Most business parks have a concentration of trees in a few areas. This makes the sites sensitive to flooding and heat stress. More green can be planted here, because there is still a lot to gain for both relatively non-green and relatively green business parks, and thereby the quality of greenery can easily be increased.

BY GREENING A BUSINESS PARK THE REAL ESTATE VALUE CAN INCREASE UP TO 40% AND THE RENT UP TO 7%.

GREEN COOLS

Heat stress, or higher temperatures in urban areas, built-up environments, reduce labor productivity. In the long run, this has a negative impact on the health of staff. The difference in temperature between city and countryside on warm days can be up to 7 degrees. Greenery helps to combat heat stress. This heat stress map shows the two business parks with the most green and a lot of heat stress, and business parks with less of greenery & less heat stress.

ONE TREE COOLS AS MUCH AS 10°C

Heat stress occurs particularly in the larger cities, such as Zwolle. The map also clearly shows that the business park Heesport has taken to increase green heat has positive effects. On many business parks in the province something can still be done to combat heat stress. Trees and green roofs are options that provide extra cooling. In terms of cooling capacity, one tree equals the equivalent of up to 10 air conditioners. A good start for entrepreneurs is therefore to look for the options for creating green roofs, green facades and installing trees species, while taking biodiversity into account (work notes included).

GREEN FOR YOUR EMPLOYEES

Greening offers all kinds of benefits in the field of HR and can therefore be a good investment. A greener environment can lead to:

- more productive employees
- reduction in sick-leaves
- increased satisfaction and, as a result, a better connection with the company
- improved concentration
- less stress
- healthier employees because a green environment encourages people to take a lunch walk

The greening of the interior spaces also has a positive effect: research from the Netherlands and Great Britain shows that in the case of green interior spaces, productivity is 15% higher compared to office spaces without plants.

WALKING TRAILS IN GREEN INCREASE PRODUCTIVITY AND HEALTH OF EMPLOYEES. THE BENEFIT INCREASE UP TO €723 PER EMPLOYEE PER YEAR.

NATURAL CAPITAL: GREENING YOUR BUSINESS PAYS OFF

1. Eensveld & Twente Noord

Temporary nature

2. XL Businesspark Twente

Greening together

3. Heesport Zwolle

NE GreenLabels

4. Greened via Hoosbeek

Greened via Hoosbeek

GREEN ON BUSINESS PARKS

Overijssel has been divided into three zones based on the proportion of green (lower 27%, middle 33% and higher 37%) on sites. In addition, there is a size chart per municipality showing what the proportion less green, average green and above average green per site is. In the format of the pie chart above how many hectares of business park there is per municipality.

Green on business parks On this map, business parks in Overijssel have been divided into three zones based on the proportion of green (lower 27%, middle 33% and higher 37%) on sites. In addition, there is a size chart per municipality showing what the proportion less green, average green and above average green per site is. In the format of the pie chart above how many hectares of business park there is per municipality.

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5. Heesport (Zwolle)

Heat stress on business parks. This map combines heat stress with the proportion of greenery on a business park. The map shows two extreme business parks with a lot of heat stress and low tree coverage (green) and business parks with little heat stress and more tree coverage (green).

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6. STEPELVELD: AMBITION TO BECOME GREENEST BUSINESS PARK

The municipality of Hoosbeek has set the bar high with the ambition to develop "The Greenest Business Park of the Netherlands". Thereby there is attention for the special landscape scenery of Twente, with her wooded banks and attention to sustainable themes such as energy, water and "hoosbeek" (own status). Flooding company Uits Ute Nederland, based at Stepelveld, has achieved a double aim by directly greening themselves as "the greenest factory in the Netherlands".

STEPELVELD OFFERS US A PERFECT COMBINATION OF ACCESSIBILITY AND DURABILITY!

Carsten Boonstra
CEO Uits Ute Nederland

GREENING TOGETHER

XL businesspark Twente - Through close cooperation between companies, local residents, government and nature organizations, XL created a green business park. 1.1 hectares of nature has been created, taking into account the interests and wishes. The maintenance of nature on sites is often overlooked, but on the XL site nature is managed in collaboration with Landbouw Natuur en Milieu. To avoid the risk of nature loss, green facades and green roofs are created, resulting in a site that has a greener appearance and a nice transition has arisen between the site and rural area.

"SOME BUSINESS CONSCIOUSLY CHOOSE FOR A VIEW ON NATURE, WHILE OTHERS WANT TO BE SITUATED NEXT TO THE HIGHWAY."

Carsten Koster, XL Businesspark Twente

7. EARNING MONEY WITH GREEN

- Do you want less risk due to flooding?
- Do you want more productive and healthier employees?
- Do you need to build new parking spaces and need a roof?
- Do you need to make an existing roof?
- Do you need to do good for people and nature?
- The creation of urban green increases biodiversity and makes the site more attractive for employees!

MAKES AND SEAMLESSLY CASUALLY CLEAN OFF RAINWATER AND THEREBY LOWER SPENDING CAUSED BY FLOODING

Do you want to know what your business park looks like after a heavy rain shower? Then view the "Simulator" (Climate Atlas) via www.uit.nl/natuur/1 or the "Watermeter" (Water Atlas) of the province Overijssel via provincieoverijssel.nl/natuur/app/natuur/1.

Which first green steps can you take for your business park to drive water stress efficiently?

- Create a well-kept and a natural buffer- and infiltration-facility that can temporarily collect rainwater. A well-kept 20% cheaper than installing a rainwater drainage system. The normally secure ditch is filled with soil and gravel on which water-loving plants grow. From the water storage area the water gradually drains away.
- Replace parking lots, for example, parking spaces with green-parking. These are or paving with permeable parks where grass or moss can grow. Precipitation can hereby easily flow into the soil.

8. FLOWING BUSINESS PARKS CREATE A WONDERFUL OPPORTUNITY TO CONTRIBUTE TO THE ENVIRONMENT

Grave Holder - The municipality of Zwanenwilde (Zwolle) in collaboration with business park "The Crane Holder" and Heesbeek made use of a flowing business park as part of a new landscape. Lovers have been inspired by the flowers. Not only do the birds benefit from this, but also songbirds. In addition, employees will be encouraged by what they see during their healthy lunch walks.

FLOWING BUSINESS PARKS CREATE A WONDERFUL OPPORTUNITY TO CONTRIBUTE TO THE ENVIRONMENT

9. OFFICIALLY DOING A GOOD JOB

GreenLabels - Business park Heesport in Zwolle is a good example of a business park where a lot of space and attention is given to greenery. With the project "Greening, Natuurlijk!" (Heesport, Heesport), they were one of the business parks to receive the GreenLabels "Cash奖励" (Award label) from C.V. Natura measures, including the creation of a bee garden, flower- and herb garden and a more natural mowing policy, attracts biodiversity. On site there are currently more than 200 plant and animal species present. NE GreenLabels hold an honorary role in the preparation of a strategy to obtain an orange label score A in the future.

GREEN YOUR ROOF

The installation of green roofs and natural facades is an excellent way to green a business park. Green roofs offer many advantages:

- Savings on cooling and heating through better insulation. Green roofs can cool the inside temperatures up to 3 °C, which then saves on costs.
- Water storage and water drainage. On green roofs an excellent for collecting water and disposing of water gradually. This can be up to 80% of retention. This reduces flooding on site.
- Increased biodiversity and better appearance. Green roofs make a building attractive for employees, customers and visitors, and create a habitat for bees, butterflies, and birds.
- Green roofs can be combined well with solar panels. The temperature on a green roof is much lower than on a regular roof. Because solar panels perform best at low temperatures, the efficiency of solar panels is higher on a green roof.

The "Green Deal Greened" (Green Deal Greened) works on providing business models for green roofs. More information or wish to participate? Visit www.greeningyourbusiness.nl.

CONSTRUCTION COSTS €4.230 PER SQUARE METRE
 High maintenance €27 per year
 Higher rain conventional roof Payback time: 10 year

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10. FIGHT FLOODING

Due to climate change there is an increase in heavy rainfall, which increases the need to drain off a lot of water in a short amount of time. The greening of a business park contributes to the water buffering capacity and green roofs, rainwater retention, rainwater retention in basins or basements. In these cases this also offers benefits, because retained rainwater is better at retaining water and thereby it stays green for a longer time. Instead of dry, yellow lawns, the green space remains a nice green.

Green roofs can retain rainwater for longer and a green outdoor area ensures that the water can infiltrate into the soil efficiently.

WELLNESS PARKS

0.0 - 0.4
0.4 - 0.8
0.8 - 1.2
1.2 - 1.6
1.6 - 2.0
2.0 - 2.4
2.4 - 2.8
2.8 - 3.2
3.2 - 3.6
3.6 - 4.0

WHAT SHOULD I PAY ATTENTION TO?

- Customization.** Allow greening to be tied to the vision, energy and ambitions of the business park. This is customization and requires advice from an expert.
- Timing.** Timing is crucial for greening. In a business park being refurbished or in a new business park being developed this is the time to start with greening.
- Linking.** As an entrepreneur or business park manager, it is important to link greening to the business. Municipalities have to do a "climate heat stress" map and a vision for the business in order to present them together more extreme weather conditions. The greening of business parks can help in reducing climate adaptation costs.
- Step-by-step.** Every little bit counts. Adding a few plants, or installing a few trees, can already enhance biodiversity and ensure an attractive natural environment.
- Management plan.** Make greening an integral part of the business park management plan. Integrating nature in terms such as insurance, logistics and safety can create a positive signal and can be used as a collective to add to the greening of the site.

11. OPPORTUNITY. TEMPORARY NATURE

Vacant sites offer great opportunities to work with green in the form of temporary nature. Temporary nature is nature that arises spontaneously when a vacant site is left unattended and where pioneer species start to grow spontaneously.

For temporary nature the investment costs are low. No design measures have to be taken. The big advantage is that it is temporary, and that the grounds can be used for economic activities later on. To create temporary nature a temporary nature expert (consulting landscape architect) can be requested or one can work with the temporary nature code of conduct (landscape architect note).

FOR TEMPORARY NATURE, EQUAL PERMISSION IS AVAILABLE. RECOGNIZING THAT THE NATURE CAN BE RECOVERED AGAIN LATER ON.

Temporary nature offers entrepreneurs different benefits:

- Reduces risks of delays in building plans.
- Provides possible routes for preventive conservation of plant and animal species.
- The environmental benefits from spontaneous nature development.

In Overijssel, experience in temporary nature has been customized. In collaboration with Overijssel, experienced with temporary nature on a vacant piece of business park, the application for this is high for both employees on the site, as well as the local residents. In addition, there is a high demand for the high retained during morning.

Read more at www.delfland.nl.

For the latest opportunities on how to get started yourself, follow this link.

www.greeningyourbusiness.nl

12. GREENING YOUR BUSINESS PAYS OFF

NATURAL CAPITAL: GREENING YOUR BUSINESS PAYS OFF

BUSINESS PARKS

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13. JUSTIFICATION

This publication has been compiled with care by the Natureverbodsbureau (Nature^Squared) in collaboration with the Province of Overijssel. In the context of the project "Natural Capital", part of the implementation programme "Natuur voor alle" (Nature for all) within the provincial plan "Beleidsplan, Economie en Bestuur" (Policy plan, Economy and Governance), Overijssel's natural, VNO-NCW, IDO, Nieuw, Greened and Landbouw Overijssel are actively involved as partners in the project.

These reports are produced by NE Natureverbodsbureau (Nature^Squared), in collaboration with Greened, based on different scientific methods. For an extensive justification of the underlying data a technical report is available upon request.

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