

**JUNE
2021**

INVENTORY

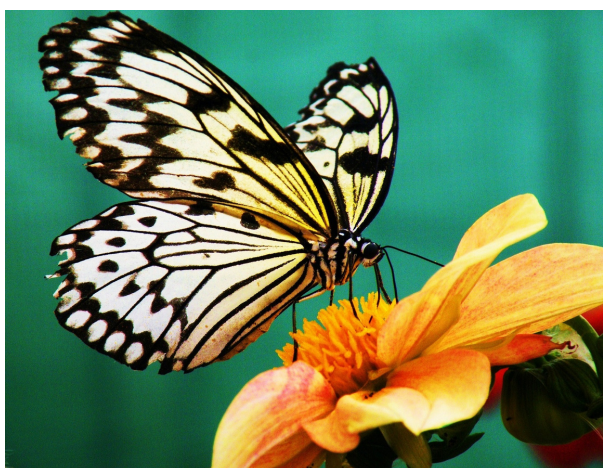
**PROJECTS ON
BIODIVERSITY AND
PROTECTION OF
ECOSYSTEMS**

CERAMIC INDUSTRY

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INTRODUCTION

In the context of the new Cerame-Unie Roadmap 2050, this Inventory showcases Projects on Biodiversity and Protection of Ecosystems, currently being developed in the Ceramic Industry not only in mining activities but also on the manufacturing plant.



The background image shows a construction site. A yellow excavator is visible on the right side, with its arm extended. The ground is uneven and covered with dirt and rocks. A dark, semi-transparent rectangular overlay covers the middle portion of the image, providing a background for the text.

ONGOING PROJECTS

"Schlagmann Climate Protection Strategy 2020"

Country: Germany

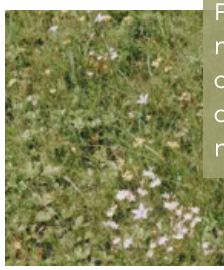
PROJECT DESCRIPTION

Through numerous projects Schlagmann developed a 3-pillar strategy that makes their top products (the perlite-filled POROTON®-T7®, -S8® and -S9®) the first climate-neutral blocks:

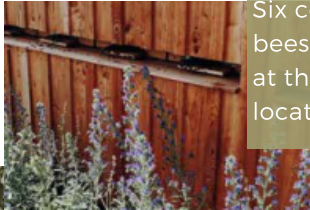
1. Save energy, avoid emissions,
2. Use renewable energies
3. Compensation through concrete UNFCCC climate protection projects.

Clay pits: "hot spots" of bio diversity - Regionally and biodiversity

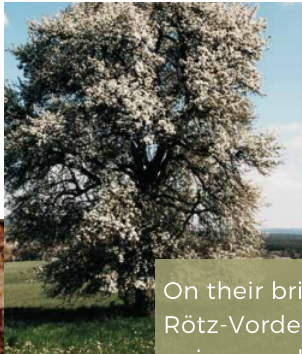
With their raw material extraction they make an important contribution to the preservation of the biodiversity in the vicinity of their brickyard sites.




Flowering meadow on one re-cultivated clay mining area




Six colonies of bees moved in at the Zeilarn location



On their brick factory in Rötze-Vorderthörn a unique and rare Wood pear tree has grown as a result of their biodiversity strategy



Nesting and breeding grounds for Kestrels are created in the gravel banks of their clay mining areas



On the disused and extensively used loam quarrying areas leave a lot of space for biodiversity: the Imperial coat butterfly can be found in the Zeilarn clay pit.

In the case of re-cultivation and compensatory measures, attention is paid to the promotion of biodiversity. For example: parts of former forest areas become natural after they have been dismantled, left to succession or reforested as mixed deciduous forest.

In their often tidy agricultural landscape, opencast mines are often "hot spots" for biodiversity, as many species find their habitat here that used to be found on the gravel banks and embankments of the now straightened rivers and streams.

START YEAR

2011

END YEAR

2021

MILLINGENWAARD (NEW)

Country: The Netherlands

Initiator: Dienst Landelijk Gebied (DLG) /

Staatsbosbeheer

Supported by: Boskalis, V/d Wetering & V/d Horst

[Link](#)

PROJECT DESCRIPTION

The construction of a (seepage) channel system creates conditions for the natural processes of the river. This means that steep slopes are constructed in outside bends, which subsequently acquire a natural shape through erosion. Steep banks offer - temporarily or otherwise - nesting opportunities for species such as sand martin and kingfisher. The steep slopes along the 'seepage fingers' prevent the banks from growing over with willows.

The objective of the Millingerwaard project is to achieve an integral hydraulic target of 9 cm (lowering the water level) at the river kilometers 867 and 868 on the Waal. This integral target can be divided into a target of 6 cm under the NURG program (1) and 3 cm from the PKB measure (2).

RESULTS:

Surface of new nature	420 hectares
Amount of clay	Approx. 320.000 m ³
Application of clay	Building Ceramic Industry
Reduction of Nitrogen (CO₂) in the soil	71, 400 kg per year
Ammonia reduction (in air)	5,712 kg per year



(1) The NURG program (Further Elaboration of the River Area) aims to develop 7,000 hectares of new nature in the flood plains of the Rhine Branches and the diked part of the Maas.

(2) PKB measure (Key Planning Decision Room for the River) falls under the policy to achieve the required safety level along the Rhine Branches and the downstream part of the Meuse.

START YEAR

1994

END YEAR

Ongoing

LEEUWENSCHEN WAARD

Country: The Netherlands

Initiator: Delgromij, Kaliwaal

Supported by: WWF, FREE nature and ARK nature development

[Link](#)

PROJECT DESCRIPTION

In 1994, the first co-flowing secondary channel in the Netherlands was constructed through collaboration between Delgromij and WWF. At that time, the existing one-sided connecting rod was connected via a clay pit to the lake Kaliwaal, which is in open connection with the Waal. This makes the eastern part of the area particularly interesting for special river valley vegetation, partly due to significant sand deposits and river dune formation. For example, species such as grass cherry, common speedwell and cat thorn have recently been found here.

In January 1995, the 'Waaier van Geulen' development vision was presented by Delgromij and WNF, which outlined a vision for the future of an affiliated nature reserve of approximately 290 ha consisting of the Leeuwense Waard, Kaliwaal and the western Drutensche Waard. Important elements are a nature-oriented delivery of clay extraction sites in the Leeuwense Waard and spoil storage in the Kaliwaal.

RESULTS:

Surface of new nature	80 hectares
Amount of clay	Approx. 250.000 m ³
Application of clay	Building Ceramic Industry
Reduction of Nitrogen (CO ₂) in the soil	13, 600 kg per year
Ammonia reduction (in air)	1,088 kg per year



START YEAR

2016

END YEAR

Ongoing

PALMERSWAARD

Country: The Netherlands

Initiator: O-GEN on behalf of Stichting Het Utrechts
landscape

Supported by: V/d Wetering

[Link](#)

PROJECT DESCRIPTION

In the coming years, some floodplains along the Nederrijn will be set up as nature reserves. This is done in the context of the Nederrijn floodplain project, commissioned by the province of Utrecht. The planning and implementation of the plan is in the hands of the O-gen Area Cooperative and the Utrecht Landscape Foundation is intensively involved in this.



RESULTS:

Surface of new nature	37 hectares
Amount of clay	7,000 m ³
Application of clay	Building Ceramic Industry
Reduction of Nitrogen (CO₂) in the soil	2,890 kg per year
Ammonia reduction (in air)	231 kg per year

START YEAR

2018

END YEAR

Ongoing

SANDENBURGERWARD

Country: The Netherlands

Initiator: Delgromij

Supported by: The Utrecht Landscape

[Link](#)

PROJECT DESCRIPTION

The excavation of the clay deck down to the sandy substrate here provides an excellent starting position for nature development. The sand substrate is lower on the dike side, creating a swampy channel here. The valuable old clay pits are preserved. The removal of the quay on the Gravenbol will increase the river dynamics in the Sandenburgerwaard. The project not only makes a direct contribution to flood risk management, some of the clay has also been used for dike improvement of the Grebbeliniedijk. The rest was supplied to the ceramic industry.

RESULTS:

Surface of new nature

11 hectares

Amount of clay

Approx. 150, 000 m³

Application of clay

Building Ceramic
Industry and dyke clay

**Reduction of Nitrogen
(CO₂) in the soil**

1, 870 kg per year

**Ammonia reduction
(in air)**

150 kg per year



START YEAR

2017

END YEAR

Ongoing

RHA BREUKINK

Country: The Netherlands

Initiator: AJ Breukink

Supported by: Delgromij

[Link](#)

PROJECT DESCRIPTION

Along the IJssel, opposite the Geldersche Toren near Rha, lies an area that is owned by Breukink. By extracting clay, this wide, agricultural-managed floodplain is delivered lowered, with opportunities for foraging and nesting waters, meadow birds and waders. Extensive management and a postponed mowing date with late grazing ensures favorable breeding conditions for meadow birds

After implementation, the management of the area is aimed at keeping the lowered site open. By removing forest and scrub storage, landings and roughening are prevented. This creates extra biodiversity in and around the channel. The extra channel length makes a positive contribution to WFD measures.

RESULTS:

Surface of new nature	4 hectares
Amount of clay	Approx. 32000 m ³
Application of clay	Building Ceramic Industry
Reduction of Nitrogen (CO₂) in the soil	Unknown
Ammonia reduction (in air)	Unknown



YEAR

2018

TERREAL

Country: France

[Link](#)

PROJECT DESCRIPTIONS

Installing Bee Hives

The idea came in 2017 from an employee of the quarry by TERREAL. She made her way into executives and now, the quarry of SaintPapoul lodges twenty-five apiaries due to the idea attracting Jean-Louis Serres, passionate local beekeeper bees onboard the project

Of the 25 hives, 23 are colonized. Located in the south, it takes order to ensure that the climate is not too humid, winter, and close to a water point to quench your thirst.

On land at the Saint-Papoul site, the group's quarries, knowing that there are an average of 30,000 individuals per hives, this installation can expect to receive more than 900,000 bees! In addition to the ecological benefits (fight against pesticides, bee preservation, biodiversity near the quarry ...), these beehives will allow average production of nearly 500 kg of honey!



Bees are pollinating insects of first choices and are therefore essential for plant reproduction. They therefore ensure the perpetual renewal of ecosystems and actively participate in the geographic expansion of plants. But the increasing use of insecticides causes the disappearance of these bees which are now threatened with extinction. We estimate at 13 million the number of missing beehives in Europe.

Preservation of Biodiversity in Chagny



In 2018, TERREAL launched a compensation plan in favor of forest fauna on the Chagny 2 (Burgundy). Bats that are part of the species concerned, the Natural history society d'Autun was asked to support deforestation of a future exploitation area of 8 hectares. In sight to avoid impacting the bat populations, all possible shelters have been identified and unoccupied cavities were recapped before the wintering period. In 2019, various partnerships will allow an improvement forest management of 80 ha.

START YEAR

2008

END YEAR

Ongoing

ECOCEA CHANGNY 2

Country: France

DATES

2008: Construction of CY2

2009: Launch of the biomethane project by SMET71 & TERREAL

2013: Start of ECOCEA works

2015: Inauguration of the unit

2016: Industrial commissioning

KEY FIGURES

- **3,800** tonnes / CO₂ emissions avoided
- **7,000** tonnes of waste treated per year
- The anaerobic digestion plant is installed on our old deposits. The quarry is also used for the daily operation of the installation: backfill, storage, etc.

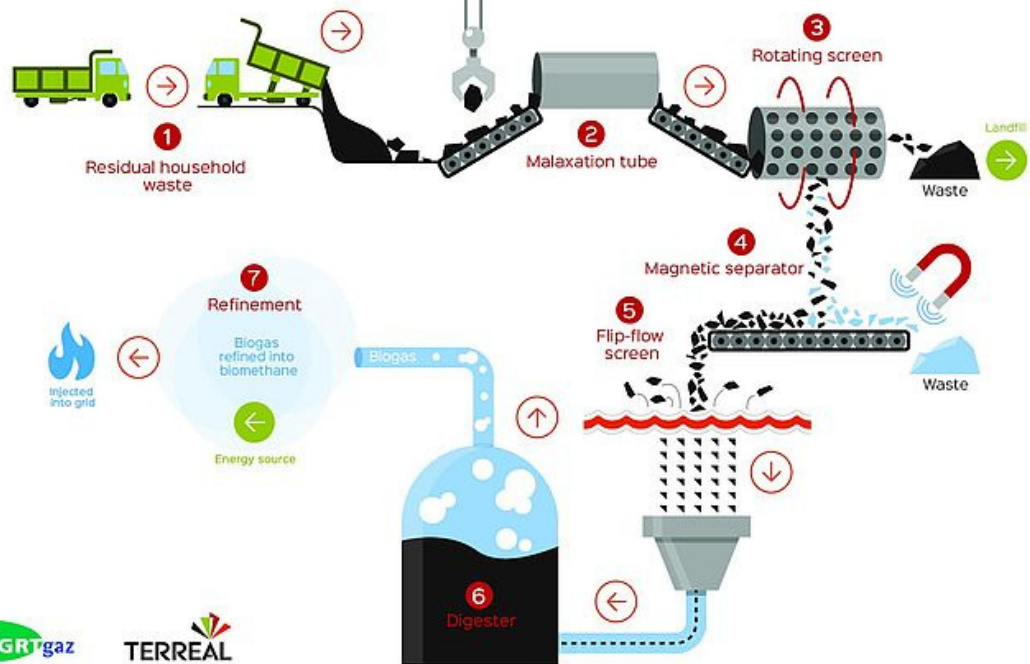
PROJECT DESCRIPTION

Built in 2008, the TERREAL plant in Chagny is the first tile factory in the world to use energy household waste to cook its tiles with biomethane to replace about a quarter of the natural gas currently consumed.

Already strongly anchored in the territories by the extraction of its raw material (clay) and the manufacturing its products, TERREAL now uses energy also produced on site from local matters.

In 2009, the elected representatives of SMET decided to build ECOCEA, a trimethanization-composting plant in order to halve landfill waste and limit pollution. The unit achieves several stages of mechanical sorting in order to extract organic elements from household waste. This material ferments in methanizers, producing biogas and digestate. The latter is mixed to green waste to produce compost. The gas produced is then purified to be injected into the network. Thanks to the intervention of GRTgaz, which strictly controls the quality of the gas injected, TERREAL can safely use biomethane mixed with natural gas to cook its tiles. Example of perfect circular economy and solidarity at the scale of a territory, The Chagny tile works of an anaerobic digestion circuit less than 200 m from its production.

ECOCEA



Biomethane
Production

Injection of
biomethane
into the gas
transport
network

Gas delivery

Valorisation of
biomethane for
cooking roof
tiles





COMPLETED PROJECTS

START YEAR

1985

END YEAR

2009

NATURE RESERVE

Country: Noale, Italy

PROJECT DESCRIPTION

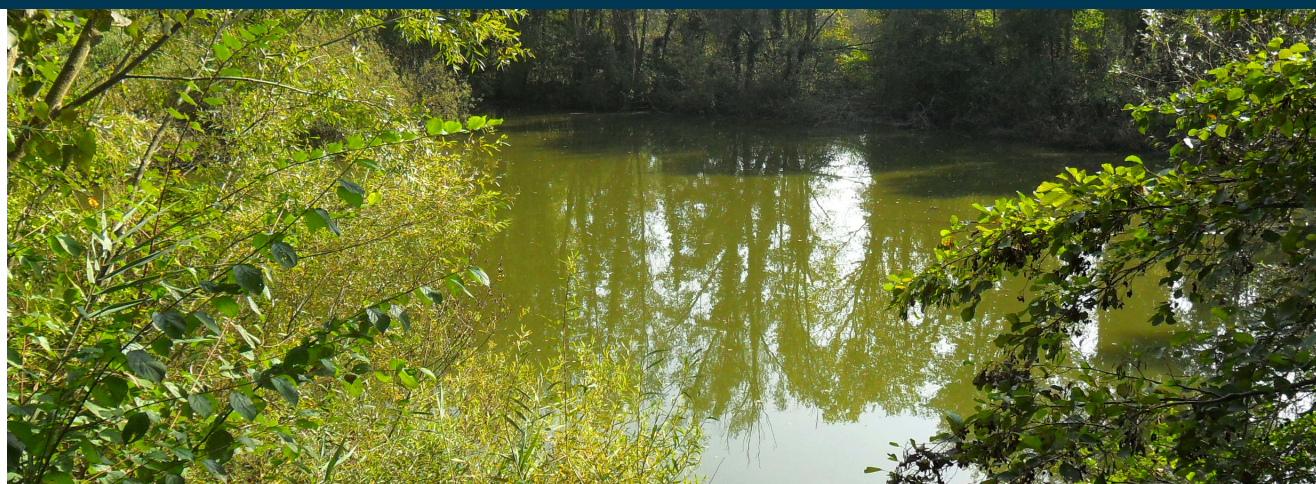
In 1985, the exploitation of the Noale quarry led to the formation of ponds favoring the local biodiversity.

Integrated into the Natura 2000 network, the site is recognized as a rich wetland in protected fauna, home to most of the bird species (189 species) inhabiting Italy.

In 2009, when the operating license was renewed, the protected area was reduced from 13 to 36 ha. It is now a popular laboratory for ornithologists and an open-air awareness center for the public.

KEY FIGURES (2009)

- **189** species of birds, of which 54 nesting on the site and 12 defined as "to be protected" by the European directive 2009/147 known as the Birds directive.
- **14** species of amphibians and reptiles, including 8 defined as "to be protected" by the directive European 92/43 Habitat, fauna and flora
- **24** species of mammals including 4 species of bats defined as "to be protected" by European directive 92/43 Habitat, fauna and flora



YEAR

2019

RHI MAGNESITA

Country: Germany

[Link](#)

APPROACH

RHI Magnesita recognise that biodiversity is essential to life and acknowledge its alarming and rapid loss across the world. Deforestation is of particular concern since forests play a critical role in mitigating climate change.

They take a regenerative approach to the areas they mine, aiming to restore them to their original state through re-cultivation and reforestation. At most open-pit mines, they conduct ongoing activities together with local partners.

PROJECT DESCRIPTIONS

1. Employees of the Niederdollendorf site planted 2,000 trees in nearby Siebengebirge natural park and provided a further 2,000 to the local conservation partner.
2. They promote biodiversity on their sites. Their Marktrechwitz site in Germany was recognised by the local Ministry of the Environment for commitment to species and insect protection in 2019. Cited as a Blossoming Business, the plant has designed its outdoor space in ways that promote biodiversity, planting bee-friendly shrubs, hedges and meadows, avoiding chemical pesticides and peat-containing substrates.

YEAR

2020

TERREAL

Country: France

[Link](#)

Aware of its role in the conservation of resources and biodiversity, the group engages cost-saving actions to limit its clay and sand withdrawals. they mobilize to design the least impactful career projects possible, to revitalize natural environments and enrich biodiversity before, during and after exploitation.

2 Commitments during the exploitation of quarries

1. Open as little area as possible on the ground to leave all its place to fauna and flora
TERREAL asks each career manager to enter a maximum open area. The objective is to make tend, in the long term, this real open surface towards the theoretical area defined in the life cycle plan. By setting goals beyond the sole constraints regulations, TERREAL is fully committed to raising this challenge.
2. Use as much material as possible within the volumes mobilized the material extracted from the quarries is not uniform and does not do not have the same characteristics. The objective is to enhance the maximum amount of material extracted through various grinding methods or as a raw material for other manufacturers.

PROJECT DESCRIPTIONS

Ecological forest management, creator of biodiversity

In the 20 hectare site of Fidora-Nord (Charente), the teams of TERREAL have mobilized to recreate an ecosystem rich in biodiversity and enhance the richness of this space.

In collaboration with local experts, they contributed to the development of local flora and fauna species.

Goals : give forest value to these perishable pine plantations and promote the local leafy species which are the richness of this massive. More than 250 species, some of which are rare in the region, can now be observed there.

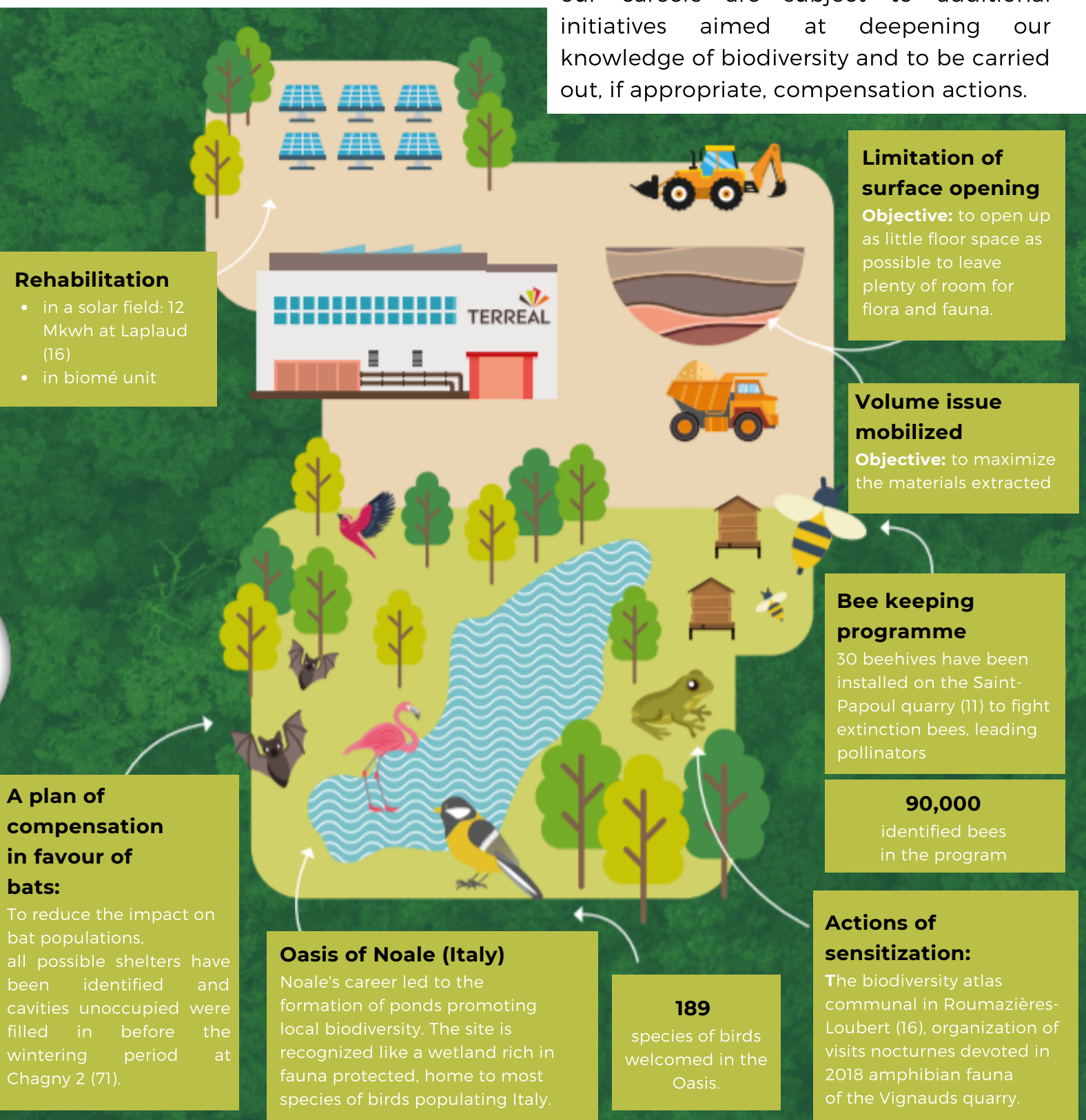
A redeveloped quarry in photovoltaic park

Beyond the regulatory requirements for quarry rehabilitation, TERREAL has carried out jointly with local actors an ambitious project generating environmental, economic and societal benefits.

Thanks to favorable solar exposure, Laplaud's former career writes a new chapter in its history with the installation of a photovoltaic park of 14 ha, 100% made in Nouvelle-Aquitaine. In one year, 12 million kWh were products, which represents the equivalent of half of the electricity consumption from our factory in Roumazières (16).

Actions in Favour of Biodiversity

Reducing our footprint on ecosystems is an issue that we have been integrating for several years, through concerted actions with elected officials and local authorities. In addition to impact studies mandatory, our careers are subject to additional initiatives aimed at deepening our knowledge of biodiversity and to be carried out, if appropriate, compensation actions.



START YEAR

1991

END YEAR

2004

LIVING WITH BRICKS

Build Naturally - Bricks with Life

Country: Austria

Initiator: Wienerberger & World Wildlife Fund

PROJECT DESCRIPTION

Partnerships between the WWF and the building materials industry show exemplary ways to protect nature and the environment while at the same time safeguarding economic interests.

Bricks are full of history, versatile and, through constant improvements in extraction, production and recycling, bearers of hope for the sustainable use of our nature.

Renaturation plans of the conservationists have been brought into line with the brickworks' plans, and ever since the excavators do not only work to extract clay as a raw material, but also to restore it to nature to create space.

The project is split into 2 steps:

1. To create space of more than 2000 hectares that could be returned for a variety of animals and plants
2. The Municipality of Hoogvliet participated in renovation and construction projects in the course of their large scale urban renewal program that increasingly focuses on the production of fair-faced bricks - while keeping one of the highest principles of sustainability: through their commitment to regional products, short transport routes thus keeping energy expenditure as low as possible. Additionally, the proceeds from the each brick sold in the project is shared directly with conservation projects.

From the mining area to living space an Austrian cooperation became an international role model: They wanted wounds that quarries and gravel dug into nature for professional associations of stone and ceramics to be returned to nature.

- Simple measures are often sufficient for this, because mining areas offer themselves as valuable refuges for species at which elsewhere their sandy, gravelly or taken from stony habitats were.

To motivate members a nature conservation prize was established for professional associations to participate.



The critically endangered Natterjack toad, the rarest and most endangered amphibian species in Austria are today exclusively on replacement habitats in gravel, loam, clay and sand pits as well as quarries reliant.

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Dragonflies are amongst the oldest insects. Already in the Carbon age they buzzed over the then stretched swamplands. Today they are critically endangered in central Europe. The main cause being the disappearance of wetlands and small bodies of water from humans and the overfertilization of waters through agriculture. Small bodies of water from quarries, gravel or clay dug play a significant role as a substitute for numerous endangered dragonfly species.

START YEAR

1992

END YEAR

2010

DE BLAUWE KARMER

Country: The Netherlands

Initiator: The Utrecht Landscape Foundation

[Link](#)

PROJECT DESCRIPTION

At the end of the 19th century, a brick factory was built on the site of the former homestead and it functioned until 1975. Almost the entire area has been dug up for the extraction of clay; on average, the site is lowered by approximately 1.5 meters. In the west around 1960 a small sand pit was created, with which marked plots were re-cultivated. On non-cultivated parts, puddles remained, such as the IJsbaan- and Eendenplas; these date back to the 1940s and 1950s (Kurstjens et al. 2011).

Due to its location at the foot of the Grebbeberg, the area has dynamics and flooding influences from the river as well as seepage from the high soils. The area is extensively (year-round) grazed with Konik horses and Galloway cattle.



RESULTS:

Surface of new nature

120 hectares

Amount of clay

Approx. 100 000 m³

Application of clay

Ceramic Industry

Reduction of Nitrogen (CO₂) in the soil

20, 400 kg per year

Ammonia reduction (in air)

1, 632 kg per year

START YEAR

1995

END YEAR

2011

MILLIGENWAARD (OLD)

Country: The Netherlands

Initiator: Delgromij / BOWEGRO

Supported by: Staatsbosbeheer, WWF, ARK nature
Development

[Link](#)

PROJECT DESCRIPTION

The Millingerwaard is one of the oldest nature development areas along the Waal. What started about 40 years ago as a small-scale clay extraction in the vicinity of a brick factory, has grown into one of the best-known examples of nature development in the Dutch River area. After clay extraction, a varied landscape remained, where softwood forest developed in lowlands and hardwood forest on the higher parts along the Waal.



RESULTS:

Surface of new nature	420 hectares
Amount of clay	Approx. 1, 000, 000 m ³
Application of clay	Building Ceramic Industry & Dyke Clay
Reduction of Nitrogen (CO₂) in the soil	See on going projects
Ammonia reduction (in air)	See on going projects

YEAR

1999

DOCUMENTARY: TRACES IN THE SAND

Country: Austria

Initiator: Chamber of Commerce (Fachverband Stein & Keramik)

Supported by: WWF

PROJECT DESCRIPTION

For a variety of plants and animal species, mining areas such as sand and gravel pits and quarries are the ideal habitat. If you take a closer look, you will discover bee-eaters, sand martins, ant lions, grasshoppers, endangered reptiles and amphibians.

The Universum editorial team, together with the Association of the Stone and Ceramics Industry, has dedicated itself to the discovery of these habitats and has created a first-class documentary entitled "Traces in the Sand",

The idea for the film was brought to the professional association from circles in the Austrian sand and gravel industry. With the active help and financial support of the Austrian Working Group for Sand and Gravel, the ballast industry, cement industry, brick industry,

"Traces in the Sand" was created in collaboration with WWF and experts who have observed the development of flora and fauna in abandoned mining areas for several years. The shooting extended over a period of one and a half years, and wildlife filmmakers intensively studied the processes in clay, sand and gravel pits.

Fascinating shots of the diversity of nature were created in more than 150 days of shooting. Landscapes that were left behind after nature had been dismantled were just as much a focus of observations as ponds that were only created by the dismantling activity.

The documentary paints a picture of a diverse biotic community, in the midst of economically used landscapes, where the conditions for the life and survival of rare species have been created.

START YEAR

2000

END YEAR

2015

BEMMELSE WAARD

Country: The Netherlands

Initiator: Forestry Commission, Rural Area Service |
Wienerberger / K3Delta

[Link](#)

PROJECT DESCRIPTION

Clay extraction has also taken place around the brick factory site. These plots have been partly recultivated in order to be able to continue agricultural use after clay extraction. In addition to sedimentation, since the 1960s, sand removal has also taken place in the area near the former stream channel.

On some of the plots on the west side of the Bemmelse Waard (Ambtswaard), measures are being taken for meadow birds, consisting of wetting and the removal of vegetation.



RESULTS:

Surface of new nature	95 hectares
Amount of clay	Approx. 200 000 m ³
Application of clay	Ceramic Clay
Reduction of Nitrogen (CO₂) in the soil	16, 150 kg per year
Ammonia reduction (in air)	1, 292 kg per year

START YEAR

2000

END YEAR

2016

AMEROGEN (EAST)

Country: The Netherlands

Initiator: Province of Utrecht, DLG & The Utrecht Landscape Foundation Boskalis & V/d Wetering

Supported by: Boskalis & V/d Wetering

[Link](#)

PROJECT DESCRIPTION

By excavating clay, marshes have been created in both the eastern parts of the Amerongse Bovenpolder, which are fed by seepage water from the Utrecht Heuvelrug. Due to the seepage water, these parts are under water for a large part of the year. A drainage ditch makes it possible to regulate the water level in the marshes.

This project was part of European agreements for improving water quality (Water Framework Directive). The implementation costs were paid by Rijkswaterstaat from this program and by subsidy from INTERREG (1). In addition, the Province of Utrecht finances a number of measures specifically for a number of target species, including the seepage marsh in the east of the area.

RESULTS:

Digging the seepage channel was also part of the NURG (Further Elaboration River Area) program of the Ministry of Economic Affairs, Agriculture and Innovation. DLG took care of the implementation.

The measures taken have created suitable habitats for amphibians, small mammals, insects and marsh birds. A watchtower provides a view of the Bovenpolder, the Nederrijn and Amerongen Castle.

Surface of new nature

40 hectares

Amount of clay

Approx. 260, 000 m³

Application of clay

Building Ceramic Industry

Reduction of Nitrogen (CO₂) in the soil

26, 800 kg per year

Ammonia reduction (in air)

544 kg per year

(1) INTERREG: A European subsidy scheme that offers opportunities for international collaboration in sustainable projects. INTERREG also stimulates cooperation in Europe for more innovative power and a better environment.

START YEAR

2002

END YEAR

2012

GOUVENEUPOLDER

Country: The Netherlands

Initiator: Delgromij / Wienerberger - Terca Baksteen

BV

[Link](#)

PROJECT DESCRIPTION

Water gentian grows locally in the tile holes; a typical plant species for shallow waters on clayey soils. These old shallow water features were created by clay extraction in the period from 2002 to 2012 and have been given a nature function. The strang along the Waalbandijk was not created by clay extraction and dates back to 1800. The nature development mainly aims at an increase in swamps, thickets and softwood forests. The first developments of this in the riparian zones can be seen in a short time.

The larger water features, including the sand extraction lake, act as a sleeping place for (wintering) geese. The flood-free terrain forms an important habitat for the natterjack toad. The area has also been designated as an important breeding area for the corncrake.

RESULTS:

Surface of new nature

75 hectares

Amount of clay

Approx. 200 000 m³

Application of clay

Building Ceramic Industry

Reduction of Nitrogen (CO₂) in the soil

12, 750 kg per year

Ammonia reduction (in air)

1, 020 kg per year



START YEAR

2004

END YEAR

2009

LOOSNE WAARD

Country: The Netherlands

Initiator: Delgromij

Supported by: Rijkswaterstaat

[Link](#)

PROJECT DESCRIPTION

As in various other places, it turned out to be possible at the Loonse Waard to achieve both goals at the same time by means of clay extraction. Rijkswaterstaat and the municipality of Wijchen drew up a redevelopment plan together with Delgromij and parties from the surrounding area. Clay has been excavated in the riparian zone for the construction of a secondary channel. The channel on both the upstream and downstream sides is permanently connected to the Maas and thus contributes to better drainage during high water. The clay was used as a raw material in brick manufacturing. The work was completed in 2009.

The shallow (down to -3 m) water in the channel also provides a favorable habitat for plants, fish and other organisms that naturally belong to this river landscape. A healthy ecosystem in turn contributes to cleaner water. Staatsbosbeheer uses ponies for grazing, so that the vegetation in this beautifully developed nature reserve is kept in check.

RESULTS:

Surface of new nature

3.2 hectares

Amount of clay

Approx. 320.000 m³

Application of clay

Building Ceramic Industry

Reduction of Nitrogen (CO₂) in the soil

1,190 kg per year

Ammonia reduction (in air)

95 kg per year



START YEAR

2004

END YEAR

2016

HEMELRIJKSE WAARD

Country: The Netherlands

Initiator: Rijkswaterstaat & Natuurmonumenten

Supported by: V/d Wetering & Delgromij

[Link](#)

PROJECT DESCRIPTION

After the implementation of the successful pilot project on the east side of the area, an area of 225 hectares was renovated. In total, approximately one million cubic meters of clay has been excavated. A large part has been used to reinforce the dikes. A smaller part has been transported via the Maas towards the factories for roofing tiles and bricks.

The secondary channels are perfect nurseries for all kinds of fish. The young fish find shelter here between the water plants and willow roots and there is an abundance of food. This in turn attracts all kinds of fish-eating birds, including cormorant and great egret. The banks of the riverbank, rich in forests, also provide a suitable habitat for the beaver.

RESULTS:

Surface of new nature	225 hectares
Amount of clay	Approx. 1, 000 000m ³
Application of clay	Building Ceramic Industry & Dyke Clay
Reduction of Nitrogen (CO ₂) in the soil	38, 250 kg per year
Ammonia reduction (in air)	3, 060 kg per year



START YEAR

2005

END YEAR

2014

KEENT

Country: The Netherlands

Initiator: Dienst Landelijk Gebied on behalf of
Rijkswaterstaat / Province of Noord-Brabant

Supported by: V/d Wetering & V/d Horst

[Link](#)

PROJECT DESCRIPTION

A new bridge has now been constructed, making the 'island' more accessible during high water. The Oude Maasarm around the island has been excavated for a length of four kilometres. This means that the Maas has regained its original course after eighty years. This increases the safety of the residents behind the dikes.

Moreover, a robust nature reserve has been created in Keent, where river-bound processes and grazing are guiding. Both clay and sand have been mined in the area. With the non-marketable topsoil, the temporary upgrading port on the Maas has been filled in. The area is now managed by the Brabant Landscape.

RESULTS:

Surface of new nature

400 hectares

Amount of clay

Approx. 320.000 m³

Application of clay

Building Ceramic
Industry

**Reduction of Nitrogen
(CO₂) in the soil**

68, 000 kg per year

**Ammonia reduction
(in air)**

5,400 kg per year



START YEAR

2005

END YEAR

2011

NEDERASSELT - DE COEHOORN

Country: The Netherlands

Initiator: Delgromij

Supported by: Dutch Cultural Landscape & Forestry Association

[Link](#)

PROJECT DESCRIPTION

Clay was extracted from a plot in the Coehoorn, south of Nederasselt. This created 'hydraulic space' to replant hedges around this plot. These hedges are important linear elements along which the badger moves from castle to foraging area and vice versa. Delgromij has made agreements with the Dutch Cultural Landscape Association (VNC), formerly Das en Boom, about the sustainable management of these clipping and shearing hedges.

The depressions created by clay extraction provide a suitable area for all kinds of amphibians. The clay extraction also makes it possible to restore the characteristic Maasheggen structure.



RESULTS:

Surface of new nature

10 hectares

Amount of clay

150,000 m³

Application of clay

Ceramic Industry

Reduction of Nitrogen (CO₂) in the soil

1,700 kg per year

Ammonia reduction (in air)

136 kg per year

START YEAR

2007

END YEAR

2010

AMEROGEN (WEST)

Country: The Netherlands

Initiator: Province of Utrecht, DLG & The Utrecht Landscape Foundation Boskalis & V/d Wetering

Supported by: Boskalis & V/d Wetering

[Link](#)

PROJECT DESCRIPTION

By excavating clay, marshes have been created in both the western parts of the Amerongse Bovenpolder, which are fed by seepage water from the Utrecht Heuvelrug. Due to the seepage water, these parts are under water for a large part of the year. A drainage ditch makes it possible to regulate the water level in the marshes.

This project was part of European agreements for improving water quality (Water Framework Directive). The implementation costs were paid by Rijkswaterstaat from this program and by subsidy from INTERREG (1). In addition, the Province of Utrecht finances a number of measures specifically for a number of target species, including the seepage marsh in the east of the area.

RESULTS:

Digging the seepage channel was also part of the NURG (Further Elaboration River Area) program of the Ministry of Economic Affairs, Agriculture and Innovation. DLG took care of the implementation.

The measures taken have created suitable habitats for amphibians, small mammals, insects and marsh birds. A watchtower provides a view of the Bovenpolder, the Nederrijn and Amerongen Castle.

Surface of new nature

17 hectares

Amount of clay

Approx. 180, 000 m³

Application of clay

Building Ceramic Industry

Reduction of Nitrogen (CO₂) in the soil

2, 890 kg per year

Ammonia reduction (in air)

231 kg per year

(1) INTERREG: A European subsidy scheme that offers opportunities for international collaboration in sustainable projects. INTERREG also stimulates cooperation in Europe for more innovative power and a better environment.

START YEAR

2016

END YEAR

2017

STADSWAARD - NIJMEGEN

Country: The Netherlands

Initiator: Province of Gelderland - / Forestry
Commission

Supported by: Combination Visser - Ploegmakers,
FHP Ploegmakers, V/d Wetering

[Link](#)

PROJECT DESCRIPTION

The interior mainly focuses on recreation; an area for the city of Nijmegen with a display window function for nature. This is a conscious choice to reduce the recreational pressure on other, ecologically more valuable nature areas in the Ooijpolder. Parallel to the development of the Stadswaard, De Bastei has opened its doors on the Waalkade. This center for nature education and cultural history wants to focus mainly on the adjacent Stadswaard with excursions.

Part of the non-marketable clay that is released during the redevelopment is used to create a flood-free refuge on the former factory site De Vlietberg for the large grazers.

RESULTS:

Surface of new nature	N/A
Amount of clay	45, 000 m3
Application of clay	Building ceramic Industry / high water refuge
Reduction of Nitrogen (CO2) in the soil	N/A
Ammonia reduction (in air)	N/A



START YEAR

2012

END YEAR

2016

VAALWAARD

Country: The Netherlands

Initiator: Natuurmonumenten & Ballast Nedam

Supported by: Delgromij

[Link](#)

PROJECT DESCRIPTION

During high water, the resulting channels must start to flow together, which creates space for the development of a more varied floodplain. The creation of an inflow opening and the construction of a guide dam, in combination with a lowered bank zone, leads to a more adventurous landscape.

The Vaalwaard is of great importance to geese and waders. On the higher parts there are scattered stream valley vegetation with cross thistle. Sometimes a corncrake breeds in the lower parts. The pollard willows are important as a breeding ground for little owls and are a characteristic element in the area. As a bird resting area, the Vaalwaard is not open to the public.

RESULTS:



Surface of new nature

17.4 hectares

Amount of clay

Approx. 75, 000 m³

Application of clay

Building Ceramic Industry

Reduction of Nitrogen (CO₂) in the soil

2, 958kg per year

Ammonia reduction (in air)

273 kg per year

START YEAR

2013

END YEAR

2015

HOOGE WAARD

Country: The Netherlands

Initiator: Rural Area Service (on behalf of the Ministry of Economic Affairs / I&M)

Supported by:

Roelofs, Oosterhuis & Delgromij

[Link](#)

PROJECT DESCRIPTION

The main goal of this project is greater safety at high water. One of the sub-projects within which this objective has been implemented is the Hooge Waard through the construction of secondary channels in the area. In addition, similar activities were carried out in the Fortmonderwaard and the Welsumerwaard. Within the entire project, nature also gained more space with the construction of secondary channels, so that plenty of river-bound plants and animals will settle here. The holiday maker has also been thought of. The construction of a fishing pier, a bridge and various walking and cycling routes, as well as a contribution to the realization of the IJssel Info Center near Den Nul, will enable everyone to experience the area better than ever.

The project was ultimately carried out in six different phases. The sub-areas Duursche Waarden, Noordelijke Roetwaard, Oenerdijkerwaarden, De Zaaï and De Enk have already been completed before 2016. The last Welsumerwaard Zuid sub-area was completed in the autumn of 2016. In total, more than 2 million m³ of soil was excavated and 255 hectares of new nature developed. The amount of ceramic clay was approximately 60,000 m³.

RESULTS

Surface of new nature	30 hectares
Amount of clay	Approx. 60, 000 m ³
Application of clay	Building Ceramic Industry
Reduction of Nitrogen (CO₂) in the soil	5, 100per year
Ammonia reduction (in air)	408kg per year

START YEAR

2016

END YEAR

2017

RAMMELWAARD

Country: The Netherlands

Initiator: Vallei en Veluwe water board on behalf of
Rijkswaterstaat

Supported by: Ploegam & V / d Biggelaar

[Link](#)

PROJECT DESCRIPTION

The Rammelwaard is located on the IJssel near Voorst and measures have been taken here for the second phase of the Water Framework Directive (KRW). By taking all kinds of measures, more natural landscapes are created where plants, fish and special insects, which originally belong to river areas, like to stay and reproduce.

Examples of these measures are: Fading of the banks; Digging trenches; Removal of the topsoil; Creation of steep edges.

Good quality water is also important for drinking water preparation, irrigation of arable and agricultural plots and drinking water for livestock and other animals. The measures for the 2nd phase consist of: Removing rubble; Application of dead wood; Construction of embankments / quays; The construction or construction of (side) channels; The creation of thresholds.

An estimated 70,000 m³ of ceramic clay was released during excavation work in the Rammelwaard (and Reuversweerd). Most of it has been used as dike clay. In addition to the 2 locations mentioned above, these measures are being carried out at around 24 locations along the entire IJssel route, which means that the water level effect cannot be indicated unambiguously. Presumably this is roughly neutral. The starting point is mainly the extra value of landscape, nature and biodiversity.

RESULTS:

Surface of new nature

15 hectares

Amount of clay

Approx. 70, 000 m³

Application of clay

Building Ceramic
Industry

**Reduction of Nitrogen
(CO₂) in the soil**

2, 550 per year

**Ammonia reduction
(in air)**

204 kg per year

START YEAR

2017

END YEAR

2018

BIODIVERSITY IMPACT ASSESSMENT

Development of a methodical approach to the introduction of the categories of biodiversity loss in the life cycle assessment

Country: Austria

Initiator: Institute of Building Research & Innovation on the behalf of the Austrian Chamber of Commerce, Association of Stones and Ceramics

PROJECT DESCRIPTION

2 research projects were carried out on the question of how the impact of products or buildings on the problem of species extinction could be recorded by means of indicators and thus included in environmental assessment of products (EPDs) as well as in the sustainability of buildings (e.g. DGNB, TQ-B, etc.).

The aim of the work was to provide a scientific assessment of the impact of different building materials on biodiversity based on 1 ton of material

The research showed that mineral building materials perform well (better than wood) in this respect.

In the next step an assessment for functional units (e.g. 1 m² of external wall) would need to be worked out, however, these studies have unfortunately been stopped for the time being due to lack of funds.

An aerial photograph of a scenic landscape featuring a large body of water, likely a lake or reservoir, surrounded by dense green forests and rolling hills. A small settlement is visible on a peninsula in the distance. The foreground shows a shoreline with several boats docked and a small building. A large, dark, semi-transparent rectangular area is overlaid on the center of the image, serving as a background for the text.

OTHER PROJECTS

PROJECTS

1. Regge
2. Dwingelderveld National Park
3. Gulp and Geul Valley
4. Bargerveen
5. Holmers-Halkenbroek

NATURAL SPONGE

Country: The Netherlands

Initiator: Natural Climate buffers

Partners: ARK (Nature Development)/LandschappenNL (Dutch Landscapes)/Nature and Environmental Federations/Natuurmonumenten/the National Forestry Service/Bird Life International The Netherlands/Wadden Sea Society/World Wildlife Fund

[Link](#)



The Natural Sponge type of climate buffer retains water in the nature zones situated upstream. This can be in the capillaries of the surface water systems (gullies, brooks), in bogland, woods and in moist moorland or wet morass.

HOW IT WORKS

The principle is based on improving the absorption of an upstream area and so relieving the system further downstream. This can be achieved by the more natural design of the shallow valley through which a stream flows (re-meandering and allowing flooding of land alongside rivers) or by creating or reconstituting an area of morass, bog or woodland. By doing this, the underlying groundwater is replenished and surface water runoff is decelerated. In this way, it helps in the prevention of flooding downstream and the formation of a freshwater buffer for dry periods.

1. REGGE

Partners: Vechtstromen Water Authority, municipalities, Landschap Overijssel, Natuurmonumenten, National Forest Service, Overijssel Province, farmers and individuals.

PROJECT DESCRIPTION

The Regge is a typical rainwater river. Canalisation meant that almost all the Regge's meanders were blocked off and the river was restrained in a straightjacket. In recent years, a long stretch of the Regge's water system has been given more space again by re-meandering and the removal of banks, so that during wet periods large sections of the original river valley can flood again and can retain the water, thereby reducing nuisance downstream.

THE PROCESS

For decades now, water authorities, municipalities and nature organisations have been working boldly on the restoration of the river's natural course to its original winter riverbed. Like strung beads, subprojects have constantly been prepared and executed in consultation with all those involved

THE EFFECTS

- Restoration of absorption: prevents flooding in the case of heavy rainfall and replenishes the supply of freshwater, also in the groundwater.
- Recovery of the river's natural dynamics.
- Development of new nature, with habitat for otters!
- Expansion of possibilities for recreation (walking, cycling, canoeing).

The Measures

In recent years, a long stretch of the Regge's water system has been expanded by means of re-meandering and removal of banks. During this, old river courses were re-excavated. The outer bends were given high, steep sides, the inner bends were given undulating, shallow banks. Adjacent plots of land have been laid out for nature that influences the river and for temporary water storage.



2. DWINGELDERVELD NATIONAL PARK

Partners: Drents Overijsselse Delta Water Authority, Natuurmonumenten, Forestry Service, Drenthe Province, Ministry of Infrastructure and Water Management (Rijkswaterstaat Agency), Dwingelderveld National Park and the Municipalities of Westerveld, De Wolden and Midden-Drenthe.

PROJECT DESCRIPTION

A former agricultural enclave has been transformed into nature. Because there is no longer any arable land in the area, the nature reserve has been able to regain its natural drainage. In this way, the nature reserve can hold much more water. Additionally, in newly created buffer zones extra water storage has been realised. This natural climate buffer has already proved its worth. After a long period of rain – as in 2014 – the Dwingelderveld ensured that the discharge of water was slowed, while the rest of the Netherlands' agriculture had to deal with an excess of water.

THE PROCESS

The Dwingelderveld National Park established a management and development plan in consultation with the parties involved, with the assignment, together with the water authority, to retain and store water in such a way that natural life also benefits to the full.

THE EFFECTS

- Prevents flooding in lower-lying areas. In the Dwingelderveld around 1.2 million cubic metres of rainwater can be temporarily stored.
- The nature reserve is larger, wetter and more quiet.
- Natural values have been enhanced. Even during the construction, cranes were already breeding!
- More attractive for recreation.

The Measures

Around 600,000 m³ of phosphate-rich topsoil from the former farming enclave has been removed. The natural water balance has been restored: restoration of channels, removal of redundant gullies and excavation of ponds. Construction of an ecoduct, removal of a metalled road running through the area; construction of carparks, cycle paths and a path for use by families.



3. GULP AND GEUL VALLEY

Prospective partners: Limburg Water Authority, Natuurmonumenten, ARK (nature development), National Forestry Service, Het Limburgs Landschap, LLTB (farmers' and market gardeners' union), Natagora, Natuurpunt, Haspengouw and Voeren Regional Landscape Association, Limburg and Liège Provinces, Municipalities of Valkenburg, Gulpen-Wittem, Meerssen and Plombières.

PROJECT DESCRIPTION

In hilly South Limburg, heavy rain showers give rise to serious flooding from time to time. The opposite is also true. In times of drought, groundwater is in short supply due to the too rapid drainage. In the years to come, nature organisations want to restructure the valley of the Gulp and Geul rivers to form a natural climate buffer, so that these problems can be solved with measures that will also improve nature and the quality of the landscape.

THE PROCESS

In collaboration with the water authority, Natuurmonumenten wants to instigate consultation with all other land users in the area, leading to joint solutions to the problems.

THE EFFECTS

- Restoration of a robust stream valley landscape from source to estuary.
- Natural water storage: slowed drainage of rainwater, and replenishment of groundwater.
- Improved water quality: prevention of erosion by redesigning and adaptation of farming methods.
- Increase in biodiversity.
- Enhancement of recreation.

The Measures

The nature organisations have developed an initial concept and in this, have pinpointed around 30 measures. These will be elaborated in consultation with the parties involved. Among other things, they involve space for meanders, the renovation of former hillside terraces and the removal of drainage. In the valley of the Upper Geul near Plombières (Belgium), land on both banks of the River Geul has already been purchased. The area will be developed to form an extensive grassy valley plain with space for spontaneous meandering.



4. BARGERVEEN

Partners: Interreg, Municipality of Emmen, Vechtstromen Water Authority, Drenthe Province, Prolander, LTO Noord (farmers' union), Staatsbosbeheer, Natuur- en Milieufederatie, Drenthe, Kadaster, NAM (natural gas extraction), Veenland Nature Park.

PROJECT DESCRIPTION

The Bargerveen is an old 2,100 hectare area of raised bog in south-eastern Drenthe Province. The past 30 years have seen efforts to preserve the core of the raised bog system. At its centre, the raised bog is once again growing ('living raised bog'). Because groundwater is still draining away to lower areas, the Bargerveen-Schoonebeek project was started in 2013. The project aims to create three buffer zones around the area to be able to retain the water in the Bargerveen.

THE PROCESS

The Bargerveen forms part of the Veenland International Nature Park. The work on the Bargerveen falls under the Bargerveen- Schoonebeek project. Staatsbosbeheer (the National Forestry Service), participates in the project's management committee as custodian of the Bargerveen.

THE EFFECTS

- Retaining water in the Bargerveen.
- Improvement of the water balance in the surrounding villages.
- Improvement of recreational facilities.
- Collection of rainwater (water storage).
- Improvement of the living environment.

The Measures

- Constructing 40 km of clay embankments.
- Land reparation
- Improvement of the water balance around the villages.
- Improving the structure of agriculture.
- Expanding recreation.
- Restoring the natural drainage from the natural drainage from the area via the De Runde stream.



5. HOLMERS-HALKENBROEK IN THE HEART OF DRENTHE (DRENTSCHE AA)

Partners: *Dienst Landelijk Gebied (former rural development agency; later Prolander/Drenthe Province), Staatsbosbeheer, Hunze and Aa's Water Authority.*

PROJECT DESCRIPTION

The lands of the Drenthe section of the River Aa (the Drentsche Aa) constitute a valley of streams covering around 34,000 hectares, from the source in the south to the downstream stretch in the north. They form part of the Drentsche Aa National Landscape and Drentsche Aa National Park.

HOW IT WORKS

The Holmers-Halkenbroek area constitutes the source and valley of the Amerdiep. The old meadows of the Holmers are situated to the north-west of Elp and form the southernmost section of the Drentsche Aa's river basin. Halkenbroek lies to the north of the Holmers. During the years 2002 to 2013, the area was transformed from agricultural land with deep gullies into a natural landscape. Due to the various measures, from now on the water seeks its own way via the natural hollows in the area. In the Holmers, this is encouraging special vegetation in the form of wet and dry moorland, developing woodland, flowery and rough grassland with rare plants and birds such as the bittern and snipe; a highly valuable source region with natural vegetation and precious plant and animal life. The stream's valley also has a water storage function in the event of flooding further downstream.

THE EFFECTS

- Enhancement of the groundwater flow to form a stream in the valley.
- Higher water level in the Holmers.
- After the renovation of the Halkenbroek, a large lake formed behind the dam that had then been constructed. That barrage can collect and hold water that flows out of the woods both over and under the ground.

The Measures

- Backfilling drainage gullies (canals) in the area and the surrounding woodlands.
- Over several winters, about 30 cm of topsoil and desiccated bog has been dug away over an area of about 75 hectares in the Holmers and northern part of Halkenbroek.
- Excavating fertilised topsoil in the Holmers.
- Construction of a shallow valley for the Halkenbroek.
- Transforming conifer woodland into deciduous woodland.



ROOM FOR NATURE AND WATER MANAGEMENT

PROJECTS

1. De Onlanden
2. Ijsselpoort
3. Zuidelijk Westerkwartier

Country: The Netherlands

Initiator: Natural Climate buffers

Partners: ARK (Nature Development)/LandschappenNL (Dutch Landscapes)/ Nature and Environmental Federations/Natuurmonumenten/the National Forestry Service/Bird Life International The Netherlands/Wadden Sea Society/ World Wildlife Fund

[Link](#)

A Blue-Green Space is a type of natural climate buffer that provides space for storing water in and around lower-lying nature reserves and in nature reserves along the major rivers. In this way, rain during peak showers can be channelled to the nature reserves, meaning that people can keep their feet dry in the surrounding towns and countryside. And along the major rivers, the space-for-water principle is applied by creating an optimally wide winter riverbed. This means that during peak discharge periods, a lower water level can be achieved than in a narrow bed. This gives rise to special marshland or fluvial nature reserves. These areas are highly valuable for both nature and recreation.

HOW IT WORKS

These types of climate buffer are designed to receive the large amounts of water that are to be expected during persistent rainfall or peak showers. At such times, excess water is received from the area's water system, sometimes through free flow because it is lower, in other cases via locks or pumps. There are often measures for retaining the water so that it can subsequently be allowed to drain away more slowly. For nature, it is essential for sufficient water to remain behind in the climate buffer. In the area around the rivers, natural climate buffers provide capacity for large volumes of water by means of various measures such as dykes being moved further back, flood plains being lowered and overflow gullies being dug.



1. DE ONLANDEN

Partners: Noorderzijlvest Water Authority (Waterschap), Drenthe Province Forestry Service (Staatsbosbeheer), Natuurmonumenten, LTO Noord (agricultural representation), the Municipalities of Noordenveld and Tynaarlo, Dienst Landelijk gebied (former state agricultural agency)

PROJECT DESCRIPTION

In 1998, heavy rain caused considerable flooding in the north of the Netherlands. To prevent this happening again, a 2,500 hectare area near the city of Groningen has been developed to combine water storage with a marshland nature reserve. And it works. Even during its creation in 2012, De Onlanden ensured that the city remained dry during persistent rainfall and that farms did not need to be evacuated.

Due to the natural, fluctuating water level, De Onlanden is now much wetter in the autumn and winter and gradually dries out in the spring and summer. A robust and varied area of marshland has come into existence where many threatened species have been conserved

THE PROCESS

De Onlanden has been incorporated into the Peize and Roden-Norg redevelopment processes. This has led to improvement in the structure of farming and at the same time, the rapid establishment of this natural climate buffer.

THE EFFECTS

- Groningen is no longer threatened by flooding.
- Construction costs were many times lower than those of all the alternatives.
- New natural marshland, ponds with many birds, and the arrival of the otter and other special species.
- Creation of new opportunities for recreation near the city.
- Less flooding in the neighbouring farmland

The Measures

Banks have been constructed to hold the water back and keep it away from the surrounding farmland. Surface vegetation has been removed and the ground excavated. Waterways, bridges, roads and cycle paths have been adapted and extended. For recreation, there are also canoe trails and special spots for observing wildlife.



2. RIVIERKLIMAATPARK IJSSELPPOORT

Partners: Ministry of Infrastructure and Water Management, Gelderland Province, Rijn and IJssel Water Authority, Natuurmonumenten, Eastern Netherlands Water Authority, Municipalities of Arnhem, Duiven, Rheden, Westervoort and Zevenaar.

PROJECT DESCRIPTION

After decades of restriction, the major rivers are now being given more space. Between Arnhem and Giesbeek, along the River IJssel, a water buffer several kilometres in length is to be constructed. There will once again be a landscape that gives water the space it needs. For Arnhem's citizens it will be a lovely spot for escaping the city and cooling down in the summer.

THE PROCESS

After decades of restriction, the major rivers are now being given more space. Between Arnhem and Giesbeek, along the River IJssel, a water buffer several kilometres in length is to be constructed. There will once again be a landscape that gives water the space it needs. For Arnhem's citizens it will be a lovely spot for escaping the city and cooling down in the summer.

THE EFFECTS

- Climate-proof, robust river system with attention to water safety.
- More space for water and nature in the flood plains.
- Connecting nature reserves, retaining water for dry periods and improving water quality.
- Improving access and enhancing perception of the area.

The Measures

The measures necessary for Rivierklimaatpark IJsselpoort will be implemented in the course of 2019 and 2020 after the joint plans have been established. To create space, the Water Authority (Waterschappen) staff are moving the dykes further inland and they are excavating overflow gullies in the flood plains.



3. ZUIDELIJK WETERKWARTIER

Partners: Groningen Province, Prolander, Noorderzijlvest Water Authority (Waterschap), Friesland Water Authority (Wetterskip Fryslân), Municipalities of Leek, Marum and Grootegast, Forestry Service, Het Groninger Landschap, LTO Noord, BoerenNatuur.

PROJECT DESCRIPTION

In the Zuidelijk (Southern) Westerkwartier, development of nature is being combined with the establishment of water storage zones. At the same time, measures are being taken in the realms of water quality, recreation, agriculture, landscape renovation and quality of life, so that residents can still live, work and enjoy free time safely and pleasantly in a future-proof environment. The target in the Dwarsdiep is to store 2.7 million m³ of water. It is expected that the water storage facility will be needed once every 10 years. De Dijken will have a storage capacity of 1.1 million m³ of water and De Drie Polders will have a capacity of 1.2 million m³. It is expected that the two zones will be used for water storage once every 25 years.

THE PROCESS

This concerns the Zuidelijk Westerkwartier Regional Development scheme. In three zones, het Dwarsdiep, De Dijken and De Drie Polders, water storage will be established in combination with nature. Staatsbosbeheer is participating in the Regional Committee, along with the other parties.

THE EFFECTS

- There is space in the region for 2,800 hectares of new nature reserve.
- Water management is being addressed. Flooding will be dealt with and the area will contribute to the freshwater supply.
- The water quality in the area is again as it should be.
- The structure of farming will be improved.
- The core features of the landscape will be restored.
- There will be more opportunities for residents and visitors alike.

The Measures

Water management measures have priority:

- Raising the water level
- Encouraging the upward seepage of ground water by making channels shallower
- Constructing levees
- Adapting the stream to provide a smaller and more natural profile with more water current and variation
- Widening the brink zones along the waterways
- Construction of a dam to retain water when utilising the storage
- Moving & adapting pumping stations

SMART RIVERS

Flood protection based on the 'DNA of a river'

Country: The Netherlands

Partners : WWF Netherlands, the Ministry of Economic Affairs, the National Forestry Service (Staatsbosbeheer), OBN (government-funded knowledge network for ecological restoration), the Ark Foundation, Stichting het Limburgs Landschap (a regional nature trust), VBNE (a cooperative association of nature trusts and estate owners) and Natuurmonumenten (a national nature trust).

[Link](#)

PROJECT DESCRIPTION

Smart Rivers is an ecosystem approach that combines flood risk management with floodplain restoration. Its central idea is that projects in the floodplain areas should always be executed in line with the 'DNA' of a river system, such as the geological make-up, morphology and river dynamics. This implies different solutions for different rivers. Smart Rivers translated the DNA of ten different river stretches in the Netherlands into practical design concepts. These design concepts can be used for river basin planning and decision making, and for actual design and implementation of floodplain restoration projects.

BENEFITS

With the Smart Rivers approach we create rivers that are much more resilient to climate change and higher water levels, while restoring their unique riverine nature. Smart Rivers creates a win-win opportunities for landscapes and economy, for example in clay mining, tourism and urban development.



DIFFERENCE BETWEEN - DNA & DESIGN CONCEPT

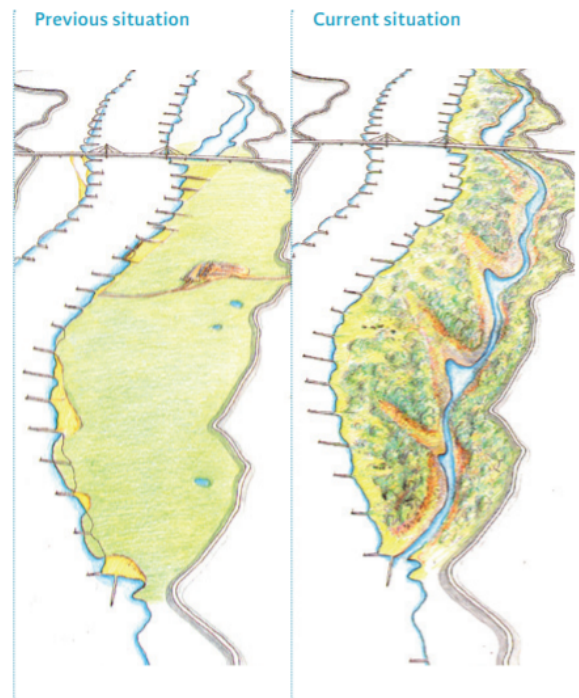
THE RIVER WAAL

DNA: Large lowland river featuring wide and flowing side channels as well as a large capacity to transport sand. This shapes rich morphological structures and sandy levees.

DESIGN CONCEPT: The realisation of new side channels by excavating the top layer of clay, thus opening up old channels and levees in underlying sandy base layers (relief-following clay excavation).

CASE STUDY: The floodplain of Gameren. Delivery of a roughly 10-centimetre drop in peak discharge levels and creation of new habitat for many rheophylic fish species (like Barbel, Snape and Chub), birdlife, Clubtail dragonflies and numerous 'river corridor plants', like Large Speedwell, Cypress Spurge and Brown Galingale.

By stripping away the clay layer, old side channels in the sandy sub soils emerge.



Figures Jeroen Heimer / VNF Living Rivers



In the project of Gameren side channels were built in 1999.



Photo Douwe Schut

SHIFT IN DUTCH FLOOD RISK MANAGEMENT

During the 1990s it became clear that ecosystem-based solutions could be a good alternative to conventional hard infrastructure measures. An important moment in this paradigm shift was the presentation of the 'Living Rivers' strategy by WWF-Netherlands in 1992.

The proposal was to redesign Dutch river floodplains to create more space for rivers and regain key natural processes. A key aspect of Living Rivers was the restoration of original side channels in river floodplains, through a partnership with the clay industry.

Until then, clay excavation had been considered a largely damaging activity for river floodplains – a perception that left the industry struggling for local and national support. Through the concept of relief-following clay excavation, thereby uncovering former side channels, the clay industry became a driving force for ecological restoration. Agriculture benefited as it was relocated to flood free locations behind winter dykes. A crucial trigger for the paradigm shift were the flood events of 1993 and 1995 along the river Meuse and the Rhine branches. Water managers shifted their focus from higher dykes to creating room for rivers to accommodate high water discharges. This led to the roll out of a several national programs of which 'Room for the River' was the largest and most extensive one. In 'Room for the River' flood safety and 'spatial quality' (including ecological rehabilitation) were inextricably linked.



New nature, new economy

Flood management programmes led to a string of restored floodplain areas and new nature reserves – all significantly adding to river safety. The ecological results were spectacular. Dutch floodplains converted from one of the most degraded in the world, to rich and highly valued natural reserves. Tourism along the rivers boomed and some cities like Nijmegen used the projects to boost their urban and economic development.

ROOM FOR LIVING RIVERS

Country: The Netherlands

Partners : Ark Natuurontwikkeling, Vogelbescherming, de natuur en milieufederaties, Natuurmonumenten, Landschappen NL, WWF

[Link](#)

PROJECT DESCRIPTION

Integrated approach:

Their integral approach for Room for Living Rivers provides guidelines to work with diverse partners on different scale levels to work together on a climate-proof river area with spatial quality.

1. **At river basin level:** Thinking big
 - a. Substantially enlarge the system, appropriate at the DNA of the river (side channels, dyke relocations, floodplain lowering, forest formation)
 - b. Restore sponges
 - c. Set up retention areas
2. **At the river course level:** increasing river dynamics in a continuous string of beads of floodplain
 - a. To combat the erosion of the summer bed
 - b. For nature and shipping
3. **Create connections and manage the whole well in large units:** for nature, recreation, nature-friendly agriculture and river management
4. **At all levels:** make way for those who enjoy the river landscape

Green Ambition:

Provide a new focus for nature restoration in the next 25 years.

- Doubling of typical river nature; equates to growth of at least 15.000 hectares of nature
- Good connections between nature reserves
- Good quality of marine life
- Varied river dynamics

HIGHLIGHTS

Underwater reserves

A lot of gains have been made with river nature, but the type of running water remain behind. Riverbanks and secondary channels do not yet have enough nature quality. They argue for underwater reserves: with constant flowing water, without disruption by shipping or other human activity.

Think Big

Climate change brings greater weather extremes. River systems must be able to adapt. This requires a different way of thinking. Think big at the level of the whole catchment area, from source to mouth.

Soil Erosion

The steady decline of the summer bed due to erosion is a major common problem for shipping and nature. They offer a new, promising solution: allow more water to flow through secondary channels and floodplains. Thinking big is a prerequisite: it can only work with a continuous string of river widening measures along the entire river

Recreation and living

More and more people want to recreate and live near the rivers. They see opportunities for new river routes with goof connections for river nature. Additionally, they see opportunities for small-scale, well-integrated habitation.

Larger scale management

River nature does not relate to a static 'vegetation layer'. They also see the solution with the water management and the nature conservation. By choosing larger management units creating space for natural cyclic processes.

Water safety and spatial quality

The river landscape is going to change drastically by the Delta Programme. It is therefore more than appropriate that the Delta Programme rivers should have a twofold objective: flood risk management and spatial quality.

